HRS DOCUMENTATION RECORD -- REVIEW COVER SHEET

Name of Site: LCP Chemicals
EPA ID № GAD099303182

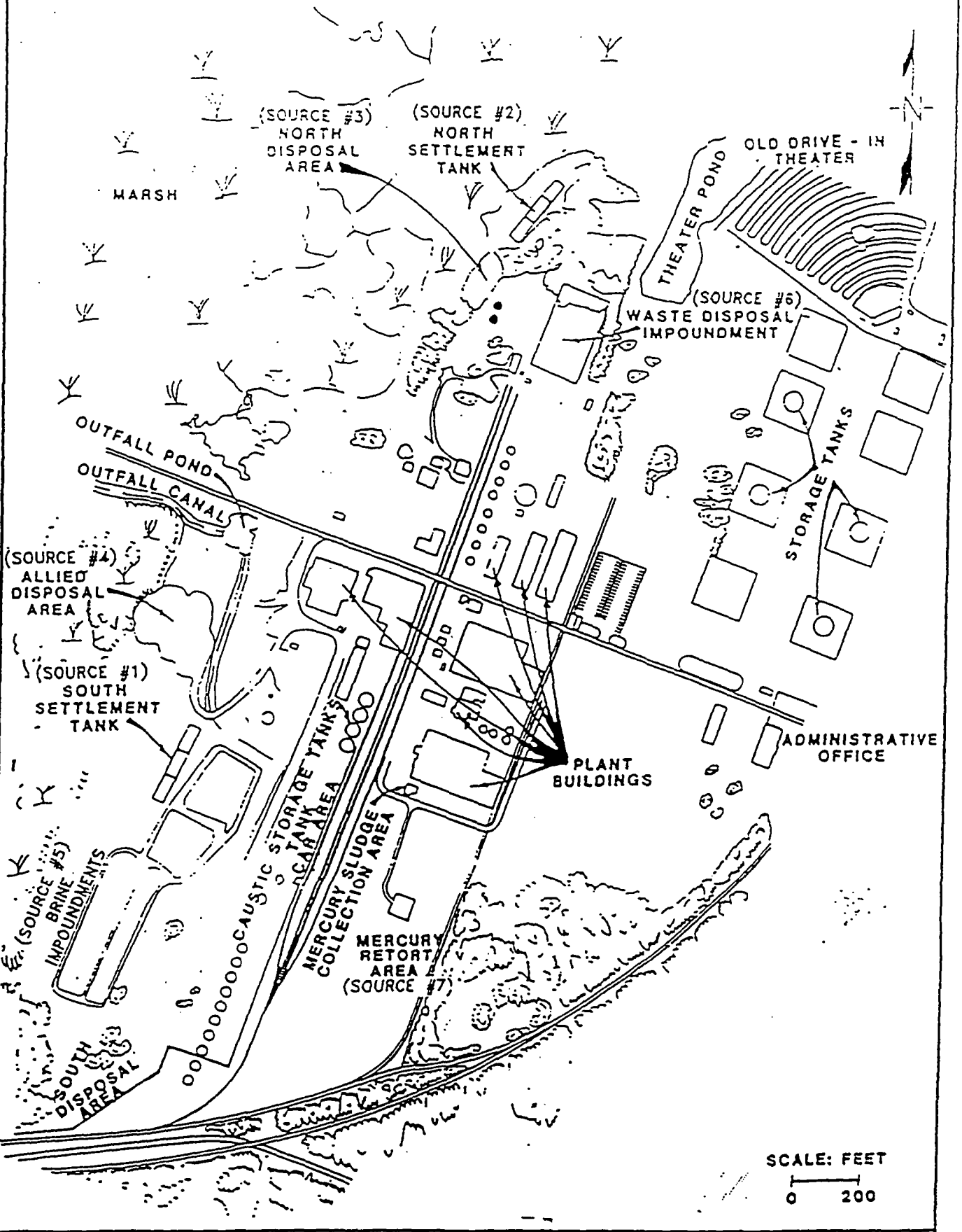
Contact Persons

U.S. EPA, Region IV:	John McKeown Deborah A. Vaughn-Wright	404/347-5059
Documentation Record:	Paul Moisan BLACK & VEATCH Waste Science, Inc.	404/594-2500

Pathways, Components or Threats Not Evaluated

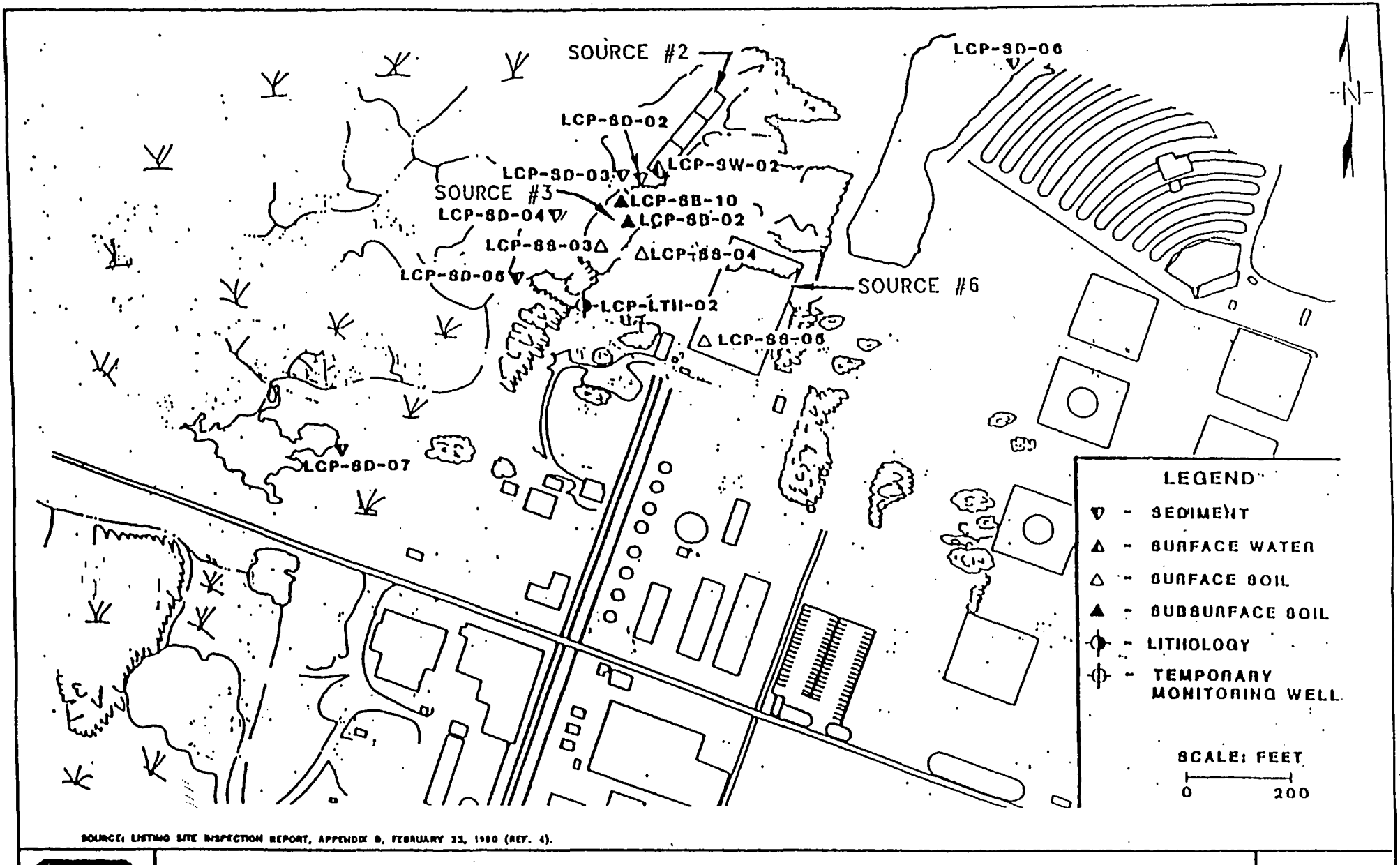
The Air Pathway will not be evaluated due to limited targets in the immediate site vicinity.

The Soil Exposure Pathway will not be evaluated due to limited targets. No resident population exists and nearby targets are not high.



SITE LAYOUT MAP
LCP CHEMICALS–GEORGIA, INC.
BRUNSWICK, GLYNN COUNTY, GEORGIA

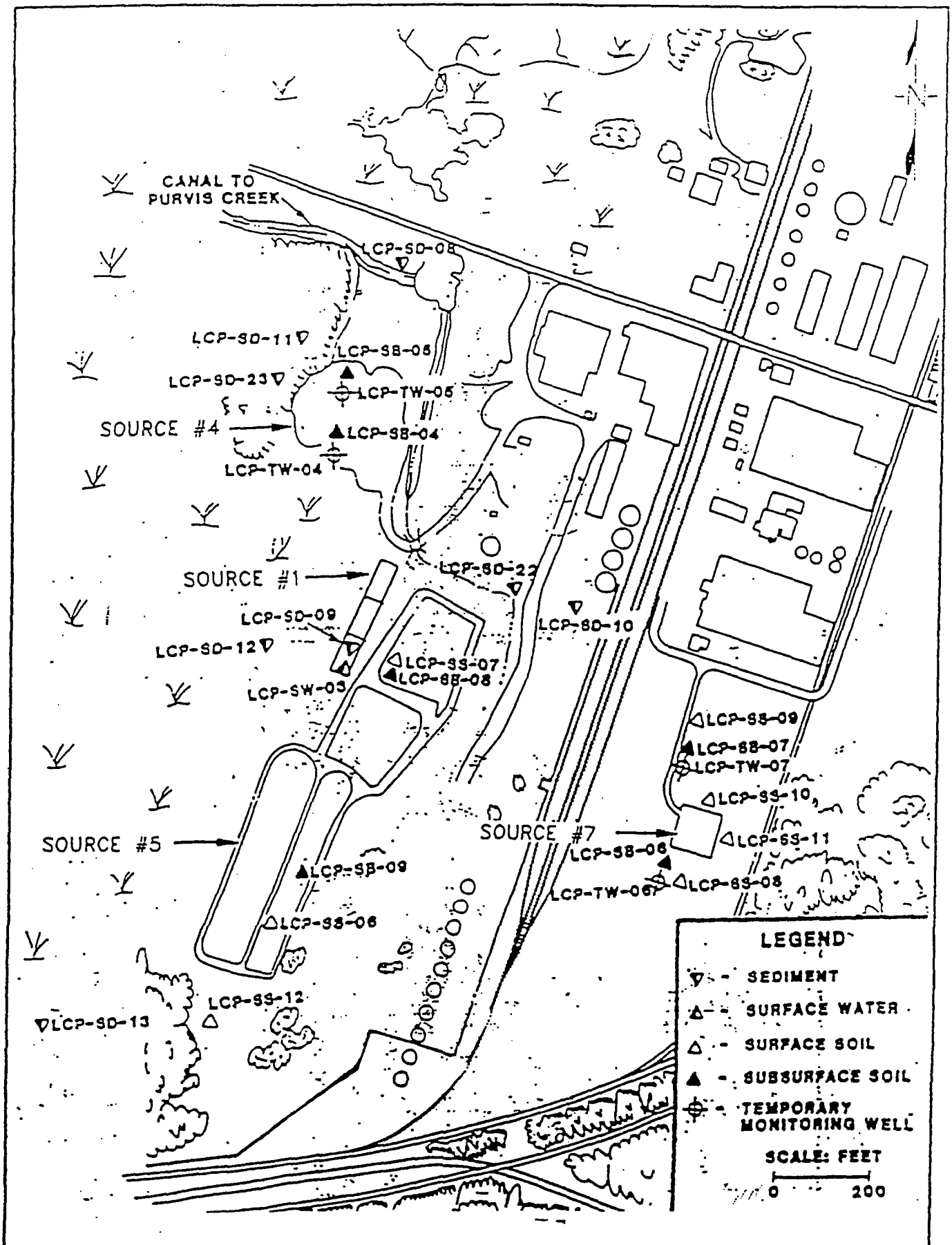
FIGURE
1



SOURCE: LISTING SITE INSPECTION REPORT, APPENDIX B, FEBRUARY 23, 1990 (REF. 4).

SAMPLING LOCATION MAP – NORTH PORTION
LCP CHEMICALS–GEORGIA, INC.
BRUNSWICK, GLYNN COUNTY, GEORGIA

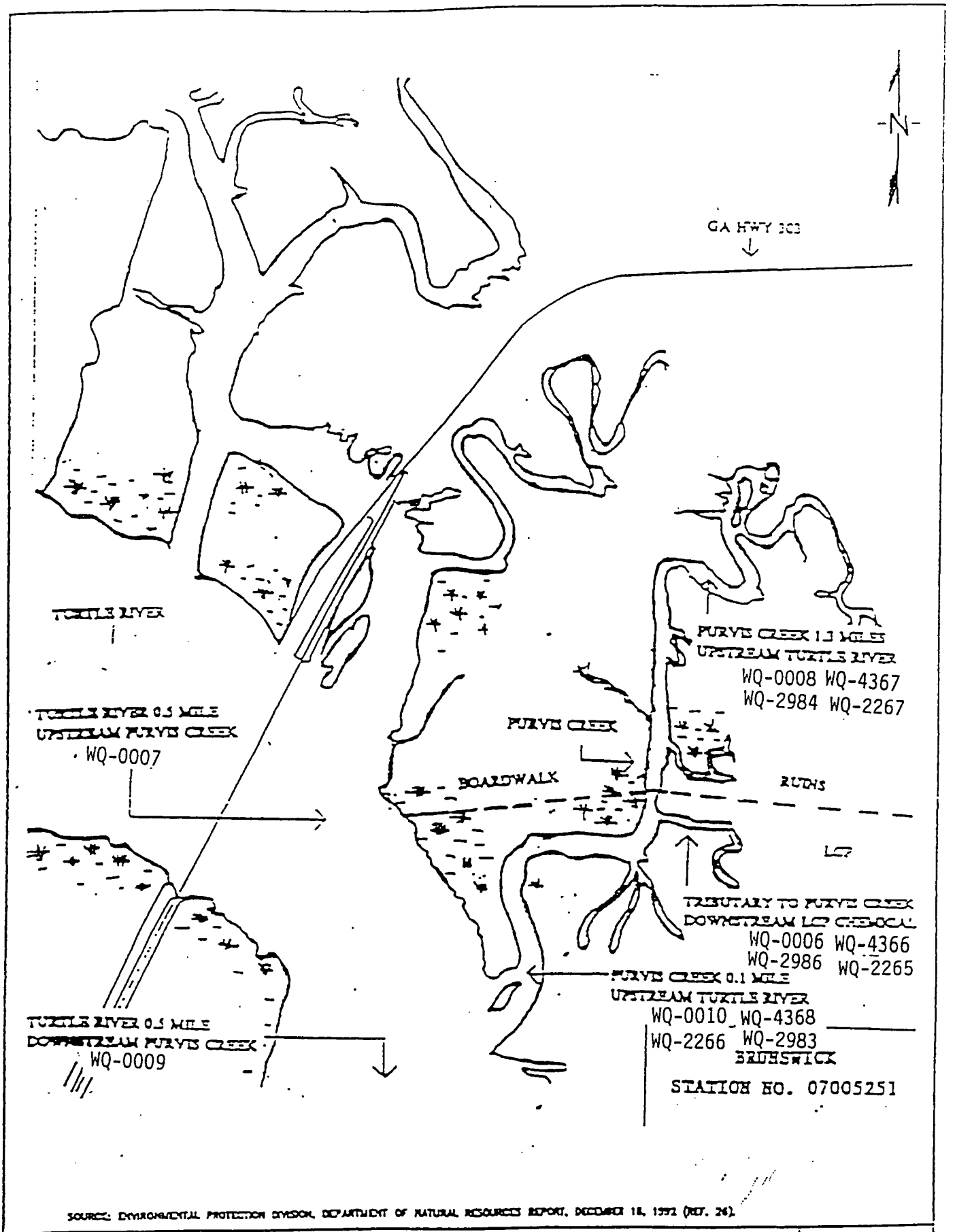
FIGURE 2



SOURCE: LISTING SITE INSPECTION REPORT, APPENDIX B, FEBRUARY 23, 1990 (REF. 4).

SAMPLING LOCATION MAP — SOUTH PORTION
LCP CHEMICALS–GEORGIA, INC.
BRUNSWICK, GLYNN COUNTY, GEORGIA

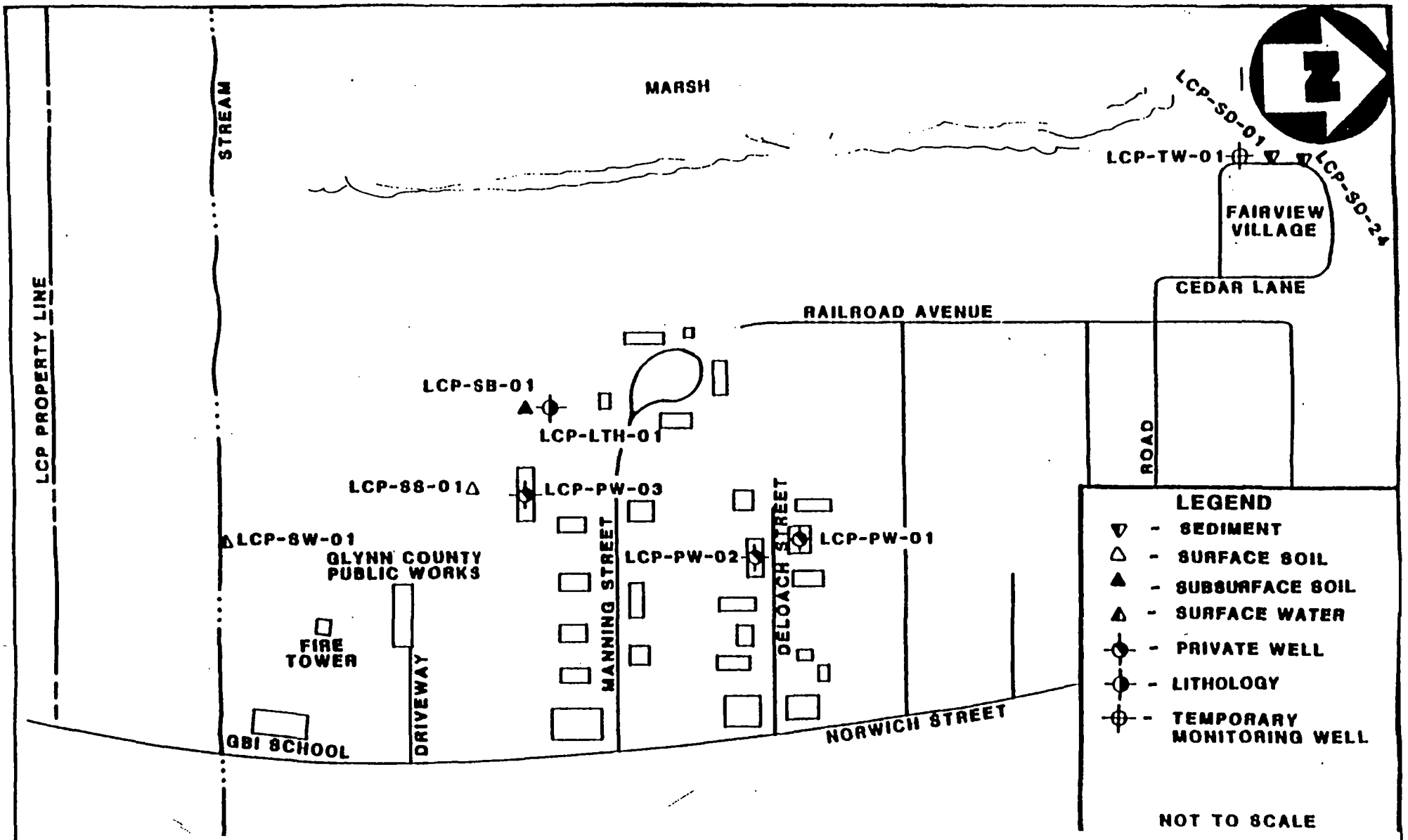
FIGURE 3



SOURCE: ENVIRONMENTAL PROTECTION DIVISION, DEPARTMENT OF NATURAL RESOURCES REPORT, DECEMBER 18, 1992 (REF. 26).

CRAB AND OYSTER SAMPLE LOCATIONS
LCP CHEMICALS–GEORGIA, INC.
BRUNSWICK, GLYNN COUNTY, GEORGIA

FIGURE 4



SAMPLING LOCATION MAP – BACKGROUND LOCATIONS
LCP CHEMICALS–GEORGIA, INC.
BRUNSWICK, GLYNN COUNTY, GEORGIA

FIGURE 5

HRS Documentation Record

Name of Site: LCP Chemicals
EPA ID № GAD099303182

EPA Region: 4 Date Prepared: February 21, 1995

Street Address of Site: Ross Road, Brunswick

County and State: Glynn County, Georgia

General Location in the State: Southeast Coast

Topographic Map: Brunswick West

Latitude: 31° 11′ 22" N Longitude: 81° 30′ 30" W
(Ref. 3; 35,p.3)

Scores

Ground Water Pathway	69.70
Surface Water Pathway	100
Soil Exposure Pathway	Not Scored
Air Pathway	Not Scored
HRS SITE SCORE	60.95

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration pathway Score (Sgw)(from Table 3-1, line 13)	69.70	4858.0900
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	100	10,000
2b.	Ground Water to Surface Water Migration component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	100	10,000
3.	Soil exposure Pathway Score (S_s) (from Table 5-1, line 22)	Not Scored	
4.	Air Migration pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	14,858.09	
6.	HRS Site Score -- Divide the value on line 5 by 4 and take the square root	60.95	

GROUND WATER MIGRATION PATHWAY SCORESHEET

FACTOR CATEGORIES AND FACTORS

	Likelihood of Release to an Aquifer	Maximum	Value Assigned	
1.	Observed Release	550	--	
2.	Potential to Release			
	2a. Containment	10	10	
	2b. Net Precipitation	10	3	
	2c. Depth to Aquifer	5	1	
	2d. Travel Time	35	1	
	2e. Potential to Release [lines 2a x (2b + 2c + 2d)]	500	50	
	Likelihood of Release (higher of lines 1 and	550		50
	Waste Characteristics			
4.	Toxicity/Mobility	a	10,000	
5.	Hazardous Waste Quantity	a	10,000	
6.	Waste Characteristics	100		100
	Targets			
7.	Nearest Well	50	20	
8.	Population			
	8a. Level I Concentrations	b	0	
	8b. Level II Concentrations	b	0	
	8c. Potential Contamination	b	1,125	
	8d. Population (lines 8a + 8b + 8c)	b	1,125	
9.	Resources	5	5	
10.	Wellhead Protection Area	20	0	
11.	Targets (lines 7 + 8d + 9 + 10)	b		1,150
	Ground Water Migration Score for an			
12.	Aquifer Score [(lines 3 x 6 x 11)/82,500][c]	100		69.70
	Ground Water Migration Pathway Score			
13.	Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)[c]	100		66.84

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors	Maximum	Value Assigned	
DRINKING WATER THREAT			
Likelihood of Release			
1. Observed Release	550	550	
2. Potential Release by Overland Flow			
2a. Containment	10	--	
2b. Runoff	25	--	
2c. Distance to Surface Water	25	--	
2d. Potential to Release by Overland Flow [lines 2a x (2b + 2c)]	500	--	
3. Potential to Release by Flood			
3a. Containment (Flood)	10	--	
3b. Flood Frequency	50	--	
3c. Potential to Release by Flood (lines 3a x 3b)	500	--	
4. Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	--	
5. Likelihood of Release (higher of lines 1 and	550		550
Waste Characteristics			
6. Toxicity/Presistence	a	10,000	
7. Hazardous Waste Quantity	a	10,000	
8. Waste Characteristics	100		100
Targets			
9. Nearest Intake	50	0	
10. Population			
10a. Level I Concentrations	b	0	
10b. Level II Concentrations	b	0	
10c. Potential Contamination	b	0	
10d. Population (lines 10a + 10b + 10c)	b	0	
11. Resources	5	5	
12. Targets (lines 9 + 10d + 11)	b		5
Drinking Water Threat Score			
13. Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to a maximum of 100)	100		3.33

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors		Maximum	Value Assigned	
HUMAN FOOD CHAIN THREAT				
Likelihood of Release				
14.	Likelihood of Release (same value as line 5)	550		550
	Waste Characteristics			
15.	Toxicity/Persistence/Bioaccumulation	a	5.0E+08	
16.	Hazardous Waste Quantity	a	10,000	
17.	Waste Characteristics	1,00		1,000
	Targets			
18.	Food Chain Individual	50	45	
19.	Population			
	19a. Level I Concentrations	b	0	
	19b. Level II Concentrations	b	0.06	
	19c. Potential Human Food Chain Contamination	b	0.000003	
	19d. Population (lines 19a + 19b + 19c)	b	0.0600003	
20.	Targets (lines 18 + 19d)			45.06000036
	Human Food Chain Threat Score			
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,5000, subject to a maximum of 100)	100		100
ENVIRONMENTAL THREAT				
	Likelihood of Release			
22.	Likelihood of Release (same value as line 5)	550		550

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(continued)

Factor Categories and Factors	Maximum	Value Assigned	
ENVIRONMENTAL THREAT, (concluded)			
Waste Characteristics			
23. Ecosystem	a	5.0E+08	
24. Hazardous Waste Quantity	a	10,000	
25. Waste Characteristics	1,00		1,000
26. Sensitive Environments			
26a. Level I Concentrations	b	500	
26b. Level II Concentrations	b	0	
26c. Potential Contamination	b	0.01325	
26d. Sensitive Environments (lines 26a + 26b + 26c)	b	500.01325	
Targets			
27. Targets (value from line 26d)			500.013255
Environmental Threat Score			
28. Environmental Threat Score [(lines 22 x 25 x 27)/82,500, subject to a maximum of 60]	60		60
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED			
29. Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)	100		100
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE			
30. Component Score (S_{oF})[c] (highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100		100

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.

References

1. U.S. Environmental Protection Agency, Hazard Ranking System, 40 CFR Part 300, Appendix A, 55 FR 51583, December 14, 1990.

2. U.S. Environmental Protection Agency, Superfund Chemical Data Matrix, June 1994, Office of Emergency and Remedial Response. Appendix B-1; 72 pages.

3. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Georgia: Jekyll Island 1979, Brunswick East 1979 (Photo revised 1988), Brunswick West 1979 (PR 1988), Dover Bluff 1979 (PR 1988), scale 1:24,000; 1 map.

4. NUS Corporation, Superfund Division, "Interim Final Listing Site Inspection Report, LCP Chemicals - Georgia, Inc., Brunswick, Glynn County, Georgia," Revision O Prepared under TDD № F4-8902-27 for the Waste Management Division of the EPA (February 23, 1990); 44 pages; Appendix B, 21 pages; Appendix C, 20 pages; Appendix D, 42 pages; Appendix E, 3 pages; Appendix F, 101 pages; Volume III: Appendix G, 383 pages.

5. January 4, 1981 Aerial Photo of LCP Chemicals, Brunswick, Georgia, scale 1:12,000; 1 map.

6. NUS Corporation Field Logbook № F4-1356 for LCP Chemicals, TDD № F4-8902-27. Documentation of fieldwork, April 24-29, 1989; 23 pages.

7. NUS corporation Field Logbook № F4-1360 for LCP Chemicals, TDD № F4-8902-27. Documentation of fieldwork, April 24-29, 1989; 18 pages.

7A. NUS Corporation Field Logbook № F4-1361 for LCP Chemicals, TDD № F4-8902-27. Documentation of fieldwork, April 24-29, 1989; 5 pages.

8. Richard E. Krause and Robert B. Randolph, Hydrology of the Floridan Aquifer System in Southeast Georgia and Adjacent Parts of Florida and South Carolina, U.S. Geological Survey Professional Paper 1403 - D,(Washington, D.C. GPO, 1989); 5 pages, Excerpt.

9. R.L. Wait, Geology and Occurrence of Fresh and Brackish Ground Water in Glynn County, Georgia, U.S. Geological Survey Water Supply Paper 1613 - D, (Washington, D.C., GPO, 1965); 13 pages, Excerpt.

10. U.S. Department of Commerce, Climatic Atlas of the United States, (Washington, D.C.: GPO, June 1968) Reprint: 1983, National Oceanic and Atmospheric Administration; 5 pages, Excerpt.

11. U.S. Department of Commerce, David M. Hershfield, Rainfall Frequency Atlas of the United States; for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years, Technical Paper № 40 (Washington, D.C.: GPO, 1961); 2 pages.

12. ~~Deleted.~~ Georgia Dept. of Natural Resources, QC for selected LCP Chemical samples, March 2, 1995. 4 pages

13. Deborah A. Vaughn-Wright, Environmental Scientist, US Environmental Protection Agency, telephone conversation with Dr. Greg Masson, Environmental Contaminant Specialist, US Fish & Wildlife Service, February 7, 1995. Subject: Endangered/Threatened Species Near the LCP Chemical Site. 1 page.

14. Willie R. Taylor, Director, Office of Environmental Policy and Compliance, US Department of the Interior, Letter to Mr. Narindar Kumar, Chief of State Programs, US Environmental Protection Agency.

January 11, 1995. Subject: Preliminary Natural Resource Survey. 19 pages.

15. Alfred R. Taylor, Manager Brunswick Plant, LCP Chemicals, letter to Ms. Jennifer R. Kaduck with attachments, Environmental Specialist, Industrial and Hazardous Waste Management Program, Department of Natural Resources, Environmental Protection Division, May 15, 1981. RE: Notification of Hazardous Waste Activity for LCP Chemicals; 6 pages.

16. Notification of Hazardous Waste Site (EPA 8900-1). Filed by Edward Shields, Director, Environmental Services, Allied Chemical, June 2, 1981; 2 pages.

17. "Alkali and Chlorine Products," Kirk-Othmer, Encyclopedia of Chemical Technology, Third edition, Vol. 1 (New York: John Wiley and Sons, Inc., 1978); pp. 799-833; 38 pages.

18. Charles Steven Walker, "Site Investigation Report, LCP Chemicals - Georgia Inc., Brunswick, Georgia GAD099303182", Prepared for the Remedial Actions Unit of the Georgia Environmental Protection Division, November 20, 1984; 49 pages.

19. Deborah A. Vaughn-Wright, Environmental Scientist, US Environmental protection Agency, Memorandum to the File dated January 18-19, 1995. Subject: LCP Chemicals, Inc., Brunswick, Glynn County, Georgia, Trip Report. 24 pages.

20. Brooke Bittinger, B&V Waste Science and Technology Corporation, telephone conversation with Mr. William Francis, Assistant Director of Brunswick Water Department, July 28, 1992. Subject: Brunswick Water System; 1 page.

21. U.S. Department of Commerce, Proof Copy of Table 6, Household, Family, and Group Quarters, Generated for 1990 CPH-1: Summary Population and Housing Characteristics: 1990, Issued by Bureau of the Census (April 1991); 1 page.

22. Map of Brunswick and Glynn County water boundaries with well locations and depths with attached page of additional well information, sent by Bill Powell, Director of Brunswick Water Department, City of Brunswick, March 20, 1992; 1 map, 2 additional pages.

23. Brooke Bittinger, B&V Waste Science, telephone conversation with Mr. William Powell, Director of Brunswick Water Department, March 17, 1992. Subject: Brunswick Water Department; 1 page.

24. Brooke Bittinger, B&V Waste Science, telephone conversation with Mr. William Powell, Director of Brunswick Water Department, July 29, 1992. Subject: Brunswick Water Department; 1 page.

25. NUS Corporation Field Logbook № F4-1358 for LCP Chemicals, TDD № F4-8902-27. Documentation of fieldwork, April 24-29, 1989; 10 pages.

25A. U.S. Geological Survey, 7.5 minute series, Topographic Quadrangle Maps of Georgia: Brunswick West 1979 (Photorevised 1988) (A), Dover Bluff 1979 (PR 1988) (B), Jekyll Island 1979 (C), Brunswick East 1979 (PR 1988) (D), Sea Island 1979 (Photoinspected 1985) (E), scale 1:24,000; 5 maps.

26. Environmental Protection Division, Georgia Department of Natural Resources, "Toxic Substances Stream Monitoring Project FY 1992

(TSSMP)," with attachments; Attachments; Report; Appendix I; Appendix II; Raw Data, 128 pages.

27. Brooke Bittinger, B&V Waste Science, telephone conversation with Mr. Larry Kloet, Environmental Engineer, Georgia Environmental Protection Division (Water Protection), December 10, 1992. Subject: Contamination from LCP Chemicals; 1 page.

28. B.T. Smith, Manager, Brunswick Works - Allied Chemical, letter and attachments to Mr. Ernest A. Regna, Director, Environmental Services Allied Chemical, May 15, 1979. Subject: Waste disposal site survey; 6 pages.

29. "Chlorinated Biphenyls and Related Compounds", Kirk-Othmer, Encyclopedia of Chemical Technology, Third edition, Vol. 5 (New York: John Wiley and Sons, Inc., 1978), pp. 844-847; 8 pages.

30. Brooke Bittinger, B&V Waste Science, telephone conversation with Mr. Jim Music, Commercial Fisheries Program Leader, Georgia Department of Natural Resources (Coastal), December 9, 1992. Subject: Recreation in the Turtle River and Purvis Creek; 1 page.

31. Brooke Bittinger, B&V Waste Science, telephone conversation with Mr. Larry Kloet, Engineer-Industrial Waste Water, Georgia Environmental Protection Division (Water Protection), December 17, 1992. Subject: Flow rates for Purvis Creek and the Turtle River; 1 page.

32. Paul Delphos, B&V Waste Science, telephone conversation with Mr. Ron Larson, Brunswick Fish & Wildlife, October 30, 1992. Subject: Endangered and Threatened species in Glynn County; 1 page.

33. U.S. EPA Contract Laboratory Program, Statement of Work for Organics Analysis; Multi-Media, Multi-Concentration, Document Number OLM010, including Rev. 2/90 - 8/91; 15 pages. Also included: U.S. EPA Contract Laboratory Program, Statement of Work for Inorganics Analysis; Multi-Media, Multi Concentration, Document Number ILM02.0, 4 pages.

34. Paul F. Moisan, BLACK & VEATCH Waste Science, Inc., telephone conversation with Sandy Quattlebaum, Comptroller, Cumberland Gas and Ice, April 21, 1994. Subject: Uses of wells at the Brunswick Cumberland Gas and Ice location; 1 page.

35. Bill Mundy, Unit Coordinator, Hazardous Waste Management Program, Georgia Department of Natural Resources, letter and attachments to James L. Johns, Vice President - General Manager, LCP Chemicals - Georgia, November 6, 1991. Subject: RCRA Facility Assessment; LCP Chemicals-Georgia, Department of Natural Resources, Environmental Protection Division, Hazardous Waste Management Program, September 30, 1990; 78 pages.

36. Alfred R. Taylor, Facility Manager, LCP Chemicals-Georgia, letter and attachments to John McKeown, U.S. Environmental Protection Agency, Waste Management Division, Waste Programs Branch, March 1, 1994. Subject: Joseph R. Fransmathes' letter dated February 9, 1994, CERCLA Section 104/RCRA Section 3007 Request, 5 pages.

37. John S. Clarke, Charles M. Hacke, and Michael F. Peck, Geology and Ground-Water Resources of the Coastal Area of Georgia, Department of Natural Resources, Environmental Protection Division. Georgia Geologic Survey Bulletin 113, (Atlanta, Georgia, 1990) (Including 12 plates and one table).

38. John Jenkins, BLACK & VEATCH Waste Science, Inc., telephone conversation with Mr. John Clarke, Hydrologist, U.S. Geological Survey Water Resources Division, Doraville, Georgia, District Office, April 28, 1994. Subject: Hydrogeology in Brunswick Georgia.

39. Law Engineering Testing Company, "Report of a Geotechnical Engineering Settlement Evaluation, Existing Chlorine Building, LCP Chemical Plant", LETCO Job № J-3664, March 18, 1981, 30 pages.

40. Brooke Bittinger, BLACK & VEATCH Waste Science, Inc., telephone conversation with Jim Music, Commercial Fisheries Program Leader, Georgia Department of Natural Resources (Coastal), November 8, 1994. Subject: Salinity in the Turtle and Brunswick rivers.

41. Brooke Bittinger, BLACK & VEATCH Waste Science, Inc., telephone conversation with Mitch Cohen, Staff Engineer, Dynamac Corp., November 7, 1994. Subject: Similarity between sediment samples.

42. Paul F. Moisan, BLACK & VEATCH Waste Science, Inc., telephone conversation with Maurice Hatfield, Private Well Owner, April 21, 1994. Subject: Uses of private drinking water wells.

List of Sources and Other Areas of Concern

Number of the Source	Type of Source	Name of the Source
1	Surface Impoundment	South Settlement Tank
2	Surface Impoundment	North Settlement Tank
3	Landfill	North Disposal Area
4	Landfill	Allied Disposal Area
5	Surface Impoundment	Brine Impoundments
6	Surface Impoundment	Waste Disposal Impoundment
7	Contaminated Soil	Mercury Retort Area

Other Potential Sources

Source Type	Name of Area
Contaminated Soil	Tank Car Area
Surface Impoundment/Pond	Outfall Pond
Contaminated Soil	Tank Support Area
Contaminated Soil	North Mercury Loading Area
Contaminated Soil	South Mercury Loading Area
Contaminated Soil/Pipeline	Former Bleach Pipeline
Contaminated Soil/Equipment	Manufacturing Cell Buildings 1 & 2
Contaminated Soil	Old Canal
Contaminated Soil	Tar Pit
Landfill	Former Glynn County Landfill
Tanks	Bunker Oil Tanks

SOURCE DESCRIPTION

2.2 Source Characterization

Number of the source: 1

Name and description of the source: Surface Impoundment

The south settlement tank is a rectangular structure that is divided into three compartments. It is made of concrete and is approximately six feet deep. The water was three to four feet deep at the time of the 1989 investigation (Ref. 4, pp. 7, 27, Appendix B, Figure B-2).

Location of the source, with reference to a map of the site:

The south settlement tank is located on the southwestern edge of the site on the border of the wetlands (Refs. 4, p. 7; 5)(See the attached maps on pages 2 and 4 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

This settlement structure appears to be constructed of concrete, which was evaluated as a liner for the purposes of this documentation record (Ref. 36, Question № 11). No leak or spill system is in existence (Ref. 36, Question № 11). This unit is not diked (Ref. 36, Question № 11). There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 3-2; 4, App. G. pp. 268, 276, 313, 314, 315, 316, 318, 320).

Value:9

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 268, 271, 272, 274, 279, 280; 26, pp. 22, 25, 26, 29, 30, 33, A-23, A-24, A-26, A-32, A-42, A-46, A-49, A-52, A-55, A-56, A-59, A-60, A-63, A-71, A-72, A-75).

Value:10

Note: Since this source is a settlement tank where hazardous substances were directly sampled, a background may not be needed. However, LCP-SW-01 and LCP-SD-01 were used as background samples in the NUS report. Therefore, to be conservative, they were used in this documentation record. This does eliminate some contaminants that would otherwise have been listed in this source.

2.4.1 Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Chloroform	6 µg/l	LCP-SW-03	4, App. G, p. 210
Lead	330,000 µg/kg	LCP-SD-09	4, App. G, p. 276
	41 µg/l	LCP-SW-03	4, App. G, p. 320
Mercury	89,000 µg/kg	LCP-SD-09	4, App. G, p. 276
	160J µg/l	LCP-SW-03	4, App. G, p. 320
PCB-1254	22,000C µg/kg	LCP-SD-09	4, App. G, p. 40
PCB-1260	130,000C µg/kg	LCP-SD-09	4, App. G, p. 40
Tetrachloroethene	86 µg/kg	LCP-SD-09	4, App. G, p. 36
Trichloroethene	26 µg/kg	LCP-SD-09	4, App. G, p. 36
Zinc	89J µg/l	LCP-SW-03	4, App. G, p. 320

C -- Confirmed by GCMS
J -- Estimated Value
SD-- Sediment Sample
SW-- Surface Water Sample

Background

Hazardous Substance	Evidence	Sample Type	Reference
Chloroform	5U µg/l	LCP-SW-01	4, App. G, p. 202
Lead	29,000 µg/kg	LCP-SD-01	4, App. G, p. 268
	4U µg/l	LCP-SW-01	4, App. G, p. 318
Mercury	3,400 µg/kg	LCP-SD-01	4, App. G, p. 268
	0.2UJ µg/l	LCP-SW-01	4, App. G, p. 318
PCB-1254	1900U µg/kg	LCP-SD-01	4, App. G, p. 4
PCB-1260	1900U µg/kg	LCP-SD-01	4, App. G, p. 4
Tetrachloroethene	15U µg/kg	LCP-SD-01	4, App. G, p. 1
Trichloroethene	15U µg/kg	LCP-SD-01	4, App. G, p. 1
Zinc	40UJ µg/l	LCP-SW-01	4, App. G, p. 318

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SD-- Sediment Sample
SW-- Surface Water Sample

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

No information on constituent quantity for the south settlement tank was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the south settlement tank was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material on the depth or volume of this source (Ref. 36, Question № 11).

2.4.2.1.4. Area

The area of the entire south settlement tank was calculated using the dimensions of 240 feet long by 35 feet wide. The area of this tank is 8,400 ft^2 (Refs. 4, App. B, Figure B-2; 5; 35, p. 15; 36, Question № 11).

Calculation

Length = 240 feet
Width = 35 feet
Area = 8,400 ft^2
For area assigned value (south settlement tank): 8,400 ft^2/13 = 646.15

Area of source (ft^2): 8,400
Reference(s): 4, App. B, Figure B-2; 5; 35, p. 15; 36, Question № 11
Area Assigned Value: 646.15

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 646.15
Reference(s): 1, Table 2-5; 4, App. B, Figure B-2; 5; 35, p. 15; 36, Question № 11

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 2

Name and description of the source: Surface Impoundment

The north settlement tank is a concrete structure that is set into the ground. The bottom of the tank is six to eight feet below land surface; the water level was approximately six inches below the top of the tank at the time of the 1989 investigation (Ref. 4, pp. 7, 28, Appendix B, Figure B-1).

Location of the source, with reference to a map of the site:

The north settlement tank is located on the northwestern edge of the site on the border of the wetlands (Ref. 4, p. 7; 5). (See the attached maps on pages 2 and 3 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

This unit appears to be constructed of concrete, which was evaluated as a liner for the purposes of this documentation record (Ref. 36, Question № 14). No leak or spill prevention system is in place (Ref. 36, Question № 14). This unit is not diked (Ref. 36, Question № 14). There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 3-2; 4, App. G, pp. 268, 276, 313, 314, 315, 316, 318, 320).

Value: 9

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 268, 271, 272, 274, 279, 280; 26, pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: 10

Note: Since this source is a settlement tank (surface impoundment) where hazardous substances were directly sampled, a background may not be needed. However, LCP-SW-01 and LCP-SD-01 were used as background samples in the NUS report. Therefore, to be conservative, they were used in this documentation record. This does eliminate some contaminants that would otherwise have been listed in this source.

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Lead	45 µg/l	LCP-SW-02	4, App. G, p. 319
Mercury	0.5J µg/l	LCP-SW-02	4, App. G, p. 319

J -- Estimated Value
SW-- Surface Water Sample

Background

Hazardous Substance	Evidence	Sample Type	Reference
Lead	4U µg/l	LCP-SW-01	4, App. G, p. 318
Mercury	0.2UJ µg/l	LCP-SW-01	4, App. G, p. 318

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SW-- Surface Water Sample

2.4.2. Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity

No information on constituent quantity for the north settlement tank was available.

2.4.2.1.2. Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the north settlement tank was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material on the depth or volume of this source (Ref. 36, Question № 14).

2.4.2.1.4. Area

The area of the north settlement tank was calculated using the dimensions of 240 feet in length by 40 feet wide (Refs. 35, p. 15; 36, Question № 14). The area of this tank is 9,600 ft^2 (Refs. 4, Appendix B, Figure B-1; 5; 35, p. 15; 36, Question № 14).

Calculation

Length = 240 feet
Width = 40
Area = 9,600 ft^2

For area assigned value (north settlement tank): 9,600 ft^2/13 = 738.46

Area of source (ft^2): 9,600

Reference(s): 4, Appendix B, Figure B-1; 5; 35, p. 15; 36, Question № 14

Area Assigned Value: 738.46

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 738.46
Reference(s): 1, Table 2-5; 4, Appendix B, Figure B-1; 5;35, p. 15; 36, Question № 14

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 3

Name and description of the source: Landfill

The north disposal area is a nearly rectangular shaped landfill area with dimensions of 170 feet by 70 feet. At the time of the 1989 investigation it was covered with a white to buff-colored chalky material, and an oily tar seepage was visible on the surface near the northern end (Ref. 4, pp. 7, 26, Appendix B, Figure B-1; 35, p. 13).

Location of the source, with reference to a map of the site:

The north disposal area is located on the northwestern edge of the site on the border of the wetlands. This area is 150 feet southwest of the north settlement tank (Refs. 4, p. 7; 5). (See the attached maps on pages 2 and 3 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of background sample. (Refs. 1, Table 3-2; 4, App. G, pp. 290, 291, 298, 300, 313, 314, 315, 316).

Value: 10

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 268, 271, 272, 274, 279, 280; 26, pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: 10

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Anthracene	80,000J µg/kg	LCP-SB-02	4, App. G, p. 98
Benzo(A)Anthracene	76,000J µg/kg	LCP-SB-02	4, App. G, p. 98
Chloroform	55,000 µg/kg	LCP-SB-02	4, App. G, p. 96
Chromium	15,000 µg/kg	LCP-SB-02	4, App. G, p. 291
Copper	160,000J µg/kg	LCP-SB-10	4, App. G, p. 298
Ethyl Benzene	78,000 µg/kg	LCP-SB-02	4, App. G, p. 96
	57 µg/kg	LCP-SB-10	4, App. G, p. 126
Lead	1,500,000 µg/kg	LCP-SB-02	4, App. G, p. 291
	32,000,000ug/kg	LCP-SB-10	4, App. G, p. 298
Mercury	800 µg/kg	LCP-SB-02	4, App. G, p. 291
Naphthalene	700,000 µg/kg	LCP-SB-02	4, App. G, p. 98
	1600 µg/kg	LCP-SB-10	4, App. G, p. 128
Phenanthrene	400,000 µg/kg	LCP-SB-02	4, App. G, p. 98
	970 µg/kg	LCP-SB-10	4, App. G, p. 128
Pyrene	240,000 µg/kg	LCP-SB-02	4, App. G, p. 98
	480J µg/kg	LCP-SB-10	4, App. G, p. 128
Toluene	110,000 µg/kg	LCP-SB-02	4, App. G, p. 96
	70 µg/kg	LCP-SB-10	4, App. G, p. 126
Xylene (Total)	350,000 µg/kg	LCP-SB-02	4, App. G, p. 96
	320 µg/kg	LCP-SB-10	4, App. G, p. 126
Zinc	18,000J µg/kg	LCP-SB-02	4, App. G, p. 291
	48,000J µg/kg	LCP-SB-10	4, App. G, p. 298

J -- Estimated Value
SB-- Subsurface Soil Sample

	Background		
Hazardous Substance	Evidence	Sample Type	Reference
Anthracene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Benzo(A)Anthracene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Chloroform	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Chromium	2,500 µg/kg	LCP-SB-01	4, App. G, p. 290
Copper	4,000UJ µg/kg	LCP-SB-01	4, App. G, p. 290
Ethyl Benzene	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Lead	1,900 µg/kg	LCP-SB-01	4, App. G, p. 290
Mercury	100U µg/kg	LCP-SB-01	4, App. G, p. 290
Naphthalene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Phenanthrene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Pyrene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Toluene	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Xylene (Total)	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Zinc	4,000UJ µg/kg	LCP-SB-01	4, App. G, p. 290

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SB-- Subsurface Soil Sample

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

No information on constituent quantity for the north disposal area was available.

2.4.2.1.2 Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the north disposal area was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material as to the depth or volume of this source (Ref. 35, p. 13).

2.4.2.1.4. Area

The area of the north disposal area was calculated using the dimensions of 170 feet long by 70 feet wide (Ref. 35, p. 13). The area of this landfill is 11,900 ft^2 (Ref. 4, p. 26, Appendix B, Figure B-1; 5; 35, p. 13).

Calculations

Length = 170 feet
Width = 70 feet
Area = 11,900 ft^2
For area assigned value (north disposal area): 11,900 ft^2/3400 = 3.5

Area of source (ft^2): 11,900
Reference(s): 4, p. 26, Appendix B, Figure B-1; 5; 35, p. 13
Area Assigned Value: 3.5

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 3.5
Reference(s): 1, Table 2-5; 4, Appendix B, Figure B-1; 5; 35, p. 13

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 4

Name and description of the source: Landfill

The Allied disposal area is approximately one acre in size and is irregular in shape. The specific wastes deposited in this landfill area are unknown (Ref. 4, pp. 7, 23, Appendix B, Figure B-2; 35, p. 13).

Location of the source, with reference to a map of the site:

The Allied disposal area is located on the western edge of the site between the south settlement tank and the outfall pond. It is surrounded by marshlands on three sides (Refs. 4, pp. 7, 23; 5)(See the attached maps on pages 2 and 4 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Ref. 1, Table 3-2; 4, App. G, pp. 268, 278, 290, 292, 293, 313, 314, 315, 316, 317).

Value: N/A

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 2, 268, 271, 272, 274, 279, 280; 26 pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: N/A

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Barium	77,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Benzo(A)Anthracene	760 µg/kg	LCP-SB-05	4, App. G, p. 106
Benzo(A)Pyrene	710 µg/kg	LCP-SB-04	4, App. G, p. 102
	560 µg/kg	LCP-SB-05	4, App. G, p. 106
Benzoic Acid	2400J µg/kg	LCP-SB-04	4, App. G, p. 102
Cobalt	7,300 µg/kg	LCP-SD-11	4, App. G, p. 278
	5,500 µg/kg	LCP-SB-05	4, App. G, p. 293
Copper	49,000J µg/kg	LCP-SB-05	4, App. G, p. 293
Chromium	7,900 µg/kg	LCP-SB-04	4, App. G, p. 292
	24,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Cyanide	2,700J µg/kg	LCP-SB-04	4, App. G, p. 334
Lead	130,000 µg/kg	LCP-SD-11	4, App. G, p. 278
	69,000 µg/kg	LCP-SB-04	4, App. G, p. 292
	120,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Manganese	110,000 µg/kg	LCP-SB-04	4, App. G, p. 292
	130,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Mercury	220,000 µg/kg	LCP-SD-11	4, App. G, p. 278
	115,000 µg/kg	LCP-SB-04	4, App. G, p. 292
	60,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Nickel	23,000 µg/kg	LCP-SD-11	4, App. G, p. 278
	20,000 µg/kg	LCP-SB-05	4, App. G, p. 293
Phenanthrene	580 µg/kg	LCP-SB-04	4, App. G, p. 102
	390J µg/kg	LCP-SB-05	4, App. G, p. 106
Pyrene	1500 µg/kg	LCP-SB-04	4, App. G, p. 102
	890 µg/kg	LCP-SB-05	4, App. G, p. 106
Zinc	140,000J µg/kg	LCP-SB-04	4, App. G, p. 292
	150,000J µg/kg	LCP-SB-05	4, App. G, p. 293

J -- Estimated Value
SD-- Sediment Sample
SB-- Subsurface Soil Sample

Background

Hazardous Substance	Evidence	Sample Type	Reference
Barium	7,000U µg/kg	LCP-SB-01	4, App. G, p. 290
Benzo(A)Anthracene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Benzo(A)Pyrene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Benzoic Acid	1600U µg/kg	LCP-SB-01	4, App. G, p. 94
Cobalt	2,700U µg/kg	LCP-SD-01	4, App. G, p. 268
	820U µg/kg	LCP-SB-01	4, App. G, p. 290
Copper	4,000UJ µg/kg	LCP-SB-01	4, App. G, p. 290
Chromium	2,5000 µg/kg	LCP-SB-01	4, App. G, p. 290
Cyanide	510U µg/kg	LCP-SB-01	4, App. G, p. 332
Lead	29,000 µg/kg	LCP-SD-01	4, App. G, p. 268
	1,900 µg/kg	LCP-SB-01	4, App. G, p. 290
Manganese	23,000 µg/kg	LCP-SB-01	4, App. G, p. 290
Mercury	3,400 µg/kg	LCP-SD-01	4, App. G, p. 268
	100U µg/kg	LCP-SB-01	4, App. G, p. 290
Nickel	20,000U µg/kg	LCP-SD-01	4, App. G, p. 268
	3,000U µg/kg	LCP-SB-01	4, App. G, p. 290
Phenanthrene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Pyrene	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Zinc	4,000UJ µg/kg	LCP-SB-01	4, App. G, p. 290

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SB-- Subsurface Soil Sample
SD-- Sediment Soil Sample

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

No information on constituent quantity for the Allied disposal area was available.

2.4.2.1.2 Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the Allied disposal area was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material on source volume.

2.4.2.1.4. Area

The exact area of the Allied disposal is unknown, and therefore not calculated. For the purposes of this documentation record, the area was assumed as greater than 0.

For area assigned value (Allied disposal area): > 0

Area of source (ft^2): > 0
Reference(s): 4, p. 23, Appendix B, Figure B-2; 5; 35, p. 13
Area Assigned Value: 0.00

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 0.00
Reference(s): 1, Table 2-5; 4, Appendix B, Figure B-2; 5; 35, p. 13

2.2. Source Characterization

Number of the source: 5

Name and description of the source: Surface Impoundment

The brine impoundment is divided into four separate sections. This source has been aggregated into one source instead of four, as the compartments are connected by a series of overflow lines (Ref. 36, Question № 23). Since the impoundments appear to be similar in type and characteristics, they have been aggregated. The impoundment was used to store a brine solution for purification and to hold brine mud that had come into contact with mercury during the Solvay process (Refs. 4, pp. 7, 25, Appendix B, Figure B-2; 6, pp. 18, 20).

Location of the source, with reference to a map of the site:

The brine impoundment is located on the southwestern edge of the site near the wetlands (Refs. 4, p. 7; 5). (See the attached maps on pages 2 and 4 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

One of the four impoundments may have been lined at one time, however this liner has deteriorated (Ref. 36, Question № 23). No leak or spill prevention system is in place at the brine impoundments (Ref. 36, Question № 23). This unit appears to be constructed of concrete, which was evaluated as a liner for the purposes of this documentation record. There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Ref. 1, Table 3-2; 4, App. G, pp. 290, 296, 297, 299, 303, 303, 304, 305, 313, 314, 315, 316, 317).

Value: 9

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 268, 271, 272, 274, 279, 280; 26, pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: 10

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Barium	1,300,000 µg/kg	LCP-SB-09	4, App. G, p. 297
Chloroform	120 µg/kg	LCP-SS-07	4, App. G, p. 150
Hexachlorobenzene	420J µg/kg	LCP-SS-07	4, App. G, p. 151
	6500 µg/kg	LCP-SB-09	4, App. G, p. 123
Hexachloroethane	1200 µg/kg	LCP-SS-07	4, App. G, p. 151
Lead	6,800 µg/kg	LCP-SB-08	4, App. G, p. 296
	68,000 µg/kg	LCP-SB-09	4, App. G, p. 297
Manganese	74,000 µg/kg	LCP-SB-09	4, App. G, p. 297
Mercury	27,000 µg/kg	LCP-SS-07	4, App. G, p. 304
	800 µg/kg	LCP-SB-08	4, App. G, p. 296
	99,000 µg/kg	LCP-SB-09	4, App. G, p. 297
Tetrachloroethene	410 µg/kg	LCP-SS-07	4, App. G, p. 150
	160 µg/kg	LCP-SB-09	4, App. G, p. 122
Trichloroethene	140 µg/kg	LCP-SS-07	4, App. G, p. 150
	39 µg/kg	LCP-SB-09	4, App. G, p. 122
Zinc	65,000J µg/kg	LCP-SS-07	4, App. G, p. 304
	44,000J µg/kg	LCP-SB-09	4, App. G, p. 297

J -- Estimated Value
SB-- Subsurface Soil Sample
SS-- Surface Soil Sample

	Background		
Hazardous Substance	Evidence	Sample Type	Reference
Barium	20,000U µg/kg	LCP-SS-01	4, App. G, p. 299
	7,000U µg/kg	LCP-SB-01	4, App. G, p. 290
Chloroform	7U µg/kg	LCP-SS-01	4, App. G, p. 131
Hexachlorobenzene	360U µg/kg	LCP-SS-01	4, App. G, p. 132
	340U µg/kg	LCP-SB-01	4, App. G, p. 94
Hexachloroethane	360UJ µg/kg	LCP-SS-01	4, App. G, p. 132
Lead	1,900 µg/kg	LCP-SB-01	4, App. G, p. 290
Manganese	32,000 µg/kg	LCP-SS-01	4, App. G, p. 299
	23,000 µg/kg	LCP-SB-01	4, App. G, p. 290
Mercury	200 µg/kg	LCP-SS-01	4, App. G, p. 299
	100U µg/kg	LCP-SB-01	4, App. G, p. 290
Tetrachloroethene	5U µg/kg	LCP-SS-01	4, App. G, p. 131
	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Trichloroethene	5U µg/kg	LCP-SS-01	4, App. G, p. 131
	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Zinc	9,000UJ µg/kg	LCP-SS-01	4, App. G, p. 299
	4,000UJ µg/kg	LCP-SB-01	4, App. G, p. 290

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SS-- Surface Soil Sample
SB-- Subsurface Soil Sample

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

No information on constituent quantity for the brine impoundment was available.

2.4.2.1.2 Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the brine impoundment was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material on the depth or volume of this source (Ref.36, Question № 23).

2.4.2.1.4. Area

The area of the brine impoundment was calculated using the dimensions given in Reference 36, Question № 23. The total area of this impoundment is 129,500 ft^2. (Ref. 4, Appendix B, Figure B-2; 5; 36, Question № 23). (See page 4 of this documentation record).

Calculations

Compartment #1 = 440 feet X 100 feet = 44,000 ft^2
Compartment #2 = 360 feet X 65 feet = 23,400 ft^2
Compartment #3 = 190 feet X 150 feet = 28,500 ft^2
Compartment #4 = 210 feet X 160 feet = 33,600 ft^2
129,500 ft^2

For area assigned value (Brine impoundment): 129,500 ft^2/13 = 9,961.54

Area of source (ft^2): 129,500
Reference(s): 4, Appendix B, Figure B-2; 5; 35, p. 12; 36, Question № 23
Area Assigned Value: 9,961.54

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 9,961.54
Reference(s): 1, Table 2-5; 4, Appendix B, Figure B-2; 5; 35, p. 12; 36, Question № 23

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 6

Name and description of the source: Surface Impoundment

The waste disposal impoundment was used for the disposal of brine mud. It is approximately one acre in size and is bermed down the middle (Refs. 4, pp. 6,7, Appendix B, Figure B-1; 7, p. 24).

Location of the source, with reference to a map of the site:

The waste disposal impoundment is located on the northern part of the facility 500 feet southwest of the theater (Refs. 4, p. 7; 5). (See the attached maps on pages 2 and 3 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

No leak or spill prevention systems are present (Ref. 36, Question № 26). No engineered liner is present within this impoundment (Ref. 36, Question № 26). This impoundment appears to be constructed of concrete, and therefore, for the purpose of this documentation record was evaluated as a liner. There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the groundwater and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Ref. 1, Table 3-2; 4, App. G, pp. 299, 302, 313, 314, 315, 316).

Value: 9

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, App. G, pp. 268, 271, 272, 279, 280; 26, pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: 10

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Cobalt	15 mg/kg	LCP-SS-05	4, App. G, p. 302
Mercury	13 mg/kg	LCP-SS-05	4, App. G, p. 302
Zinc	65J mg/kg	LCP-SS-05	4, App. G, p. 302

J -- Estimated Value
SS-- Surface Soil Sample

Background

Hazardous Substance	Evidence	Sample Type	Reference
Cobalt	0.86U mg/kg	LCP-SS-01	4, App. G, p. 299
Mercury	0.2 mg/kg	LCP-SS-01	4, App. G, p. 299
Zinc	9UJ mg/kg	LCP-SS-01	4, App. G, p. 299

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SS-- Surface Soil Sample

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

No information on constituent quantity for the waste disposal impoundment was available.

2.4.2.1.2 Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the waste disposal impoundment was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information in available file material on the depth or volume of this source (Ref. 36, Question № 26).

2.4.2.1.4. Area

The area of the waste disposal impoundment was calculated using the dimensions of 200 feet long by 200 feet wide (Ref. 36, Question № 26). The area of this impoundment is 40,000 ft^2. (Ref. 4, Appendix B, Figure B-1; 5; 35, p. 14; 36, Question № 26).

Calculations

Length = 200 feet
Width = 200 feet
Area = 40,000 ft^2

For area assigned value (waste disposal impoundment): 40,000/13 = 3,076.92

Area of source (ft^2): 40,000
Reference(s): 4, Appendix B, Figure B-1; 5; 35, p. 14; 36, Question № 26
Area Assigned Value: 3,076.92

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source Hazardous Waste Quantity Value: 3,076.92
Reference(s): 1, Table 2-5; 4, Appendix B, Figure B-1; 5; 35, p. 14; 36, Question № 26

SOURCE DESCRIPTION

2.2. Source Characterization

Number of the source: 7

Name and description of the source: Contaminated Soil

The mercury retort area was used to reclaim mercury from sludge generated in the process of making chlorine. This area consists of both a retort and a distillation unit for recovering mercury. (Ref. 4, p. 24).

Location of the source, with reference to a map of the site:

The mercury retort area is located on the southern part of the facility approximately 650 feet east of the brine impoundment (Refs. 4, p. 7; 5). (See the attached maps on pages 2 and 4 of this documentation record which delineate the sources at the LCP facility).

Containment

Release to groundwater:

There is no evidence of a liner underlying the mercury retort area, and therefore the concrete pad was evaluated as a liner for the purposes of this documentation record. There is evidence of contaminants in the groundwater which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Ref. 1, Table 3-2; 4, App. G, pp. 290, 294, 299, 306, 307, 308, 313, 314, 315, 316).

Value: N/A

Release via overland migration and/or flood:

There is evidence of contaminants in the surface water which were also detected in this source. Contaminants were found in the surface water and the source at levels greater than three times the background sample or at levels greater than the SQL of the background sample. (Refs. 1, Table 4-2; 4, pp. App. G, pp. 268, 271, 272, 274, 279, 280; 26, pp. 22, 26, 30, A-24, A-28, A-32, A-49, A-56, A-60, A-71, A-72, A-75).

Value: N/A

2.4.1. Hazardous Substances

Hazardous Substance	Evidence	Sample Type	Reference
Benzo(A)Anthracene	420 µg/kg	LCP-SS-08	4, App. G, p. 155
Benzo(A)Pyrene	650 µg/kg	LCP-SS-08	4, App. G, p. 155
Chromium	8,300 µg/kg	LCP-SB-06	4, App. G, p. 294
Copper	63,000J µg/kg	LCP-SS-10	4, App. G, p. 307
Dieldrin	310 µg/kg	LCP-SS-08	4, App. G, p. 157
Lead	220,000 µg/kg	LCP-SS-10	4, App. G, p. 307
	34,000 µg/kg	LCP-SB-06	4, App. G, p. 294
Mercury	130,000 µg/kg	LCP-SS-08	4, App. G, p. 305
	7,900 µg/kg	LCP-SS-10	4, App. G, p. 307
	100,000 µg/kg	LCP-SS-11	4, App. G, p. 308
	51,000 µg/kg	LCP-SB-06	4, App. G, p. 294
Nickel	9,200 µg/kg	LCP-SS-11	4, App. G, p. 308
	25,000 µg/kg	LCP-SB-06	4, App. G, p. 294
Tetrachloroethene	8 µg/kg	LCP-SB-06	4, App. G, p. 109
Toluene	440 µg/kg	LCP-SS-10	4, App. G, p. 162
	39 µg/kg	LCP-SB-06	4, App. G, p. 109
Zinc	72,000J µg/kg	LCP-SS-08	4, App. G, p. 305
	53,000J µg/kg	LCP-SS-10	4, App. G, p. 307
	48,000J µg/kg	LCP-SS-11	4, App. G, p. 308

J -- Estimated Value
SB-- Subsurface Soil Sample
SS-- Surface Soil Sample

	Background		
Hazardous Substance	Evidence	Sample Type	Reference
Benzo(A)Anthracene	360U µg/kg	LCP-SS-01	4, App. G, p. 132
Benzo(A)Pyrene	360U µg/kg	LCP-SS-01	4, App. G, p. 132
Chromium	2,500 µg/kg	LCP-SB-01	4, App. G, p. 290
Copper	7,000UJ µg/kg	LCP-SS-01	4, App. G, p. 299
Dieldrin	17U µg/kg	LCP-SS-01	4, App. G, p. 134
Lead	48,000 µg/kg	LCP-SS-01	4, App. G, p. 299
	1,900 µg/kg	LCP-SB-01	4, App. G, p. 290
Mercury	200 µg/kg	LCP-SS-01	4, App. G, p. 299
	100U µg/kg	LCP-SB-01	4, App. G, p. 290
Nickel	5,000U µg/kg	LCP-SS-01	4, App. G, p. 299
	3,000U µg/kg	LCP-SB-01	4, App. G, p. 290
Tetrachloroethene	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Toluene	20U µg/kg	LCP-SS-01	4, App. G, p. 131
	5U µg/kg	LCP-SB-01	4, App. G, p. 93
Zinc	9,000UJ µg/kg	LCP-SS-01	4, App. G, p. 299

U -- Material analyzed for but not detected. The number is the minimum quantitation limit.
J -- Estimated Value
SS-- Surface Soil Sample
SB-- Subsurface Soil Sample

2.4.2 Hazardous Waste Quantity

2.4.2.1.1 Hazardous Constituent Quantity

No information on constituent quantity for the mercury retort area was available.

2.4.2.1.2 Hazardous Wastestream Quantity

No information on hazardous wastestream quantity for the mercury retort area was available.

2.4.2.1.3. Volume

Volume was not evaluated since there was no information of volume in available file material (Ref. 4, Appendix B, Figure B-2; 5).

2.4.2.1.4. Area

The exact dimensions of the concrete pad at the mercury retort area was not given, therefore the area of the contaminated soil adjacent to the mercury retort area is not known and was not calculated. For the purposes of this documentation record, the area was assumed as greater than 0.

For area assigned value (mercury retort area): > 0

Area of source (ft^2): > 0
Reference(s): 4, Appendix B, Figure B-2; 5
Area Assigned Value: 0.00

2.4.2.1.5. Source Hazardous Waste Quantity Value

Other Potential Sources

Descriptions of other potential sources without adequate information for complete characterization are presented below:

- Outfal Pond: Surface water, treated spillage from the tank car area and discharge from the waste water treatment plant were discharged to this pond. (Ref.35, p.15) Discharge from the pond goes to the marsh (Ref.35, p.15; 19,p.3) Piles of anodes are visible in the pond and along the levee. (Ref.19, p.3)

- Tank Support Area: This area is currently characterized by concrete tank supports and black tar-like substance on the ground. No records of waste disposal exist for this area but it is suspected that when the tanks were dismantled after World War II, the tank bottoms were spread over the ground (Ref.35, p.15-16)

- Tank Car Area: Main loading area for railroad tank cars. Spills of bleach and caustic were reported. (Ref.35, p.14)

- North Mercury Loading Area: This is the mercury loading area located on the north side of the northern cell building. Spills during the loading process apparently occurred. (Ref.35, p.16)

- South Mercury Loading Area: Located on the South side of the south cell building. Approximately 1000 pounds of elemental mercury was spilled in this area in May 1991. (Ref. 35, p.16)

- Former Bleach Pipeline: A 6,000-foot, underground pipeline that carried 5% sodium hypochlorite. The pipeline was ordered closed and removed in March 1990. Contaminated soil may still be associated with the area. (Ref.35, p.16)

- Cell Buildings 1&2: Deteriorated buildings that hold the electrolytic cells which were used to produce chlorine gas, hydrogen gas, muriatic acid and caustic solution. Fifty cells were located in each building and each cell held approximately 4800 pounds of mercury. (Ref.19, p.2) Mercury is found throughout the buildings, leaking from pipes and as drops/globules on the floor. (Ref.19, p.2)

- Bunker Oil Tanks: Currently used to store untreated waste water (Ref.19, p.2)

- Old Canal: A canal once existed along the eastern edge of the facility. The canal was probably originally built for barge traffic. Most of the former canal is filled-in. However, it appears that several of the sources may have built in or adjacent to this old canal. It is unknown if any wastes were deposited into the old canal before it was filled in. (Ref. 19, p.3)

- Tar Pit: An area south of the Brine Impoundments and suspected to have received tar or asphalt. (Ref. 19, p.4)

- Former Glynn County Landfill: Located on LCP property. This is a closed landfill operated by the county. The landfill is north of the LCP facility. The police gun range is located over part of the old landfill. (Ref.19, p.5)

SITE SUMMARY OF SOURCE DESCRIPTIONS

Source Number	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	646.15	9	10	--	----
2	738.46	9	10	--	----
3	3.50	10	10	--	----
4	*0.00	N/A	N/A	--	----
5	9961.54	9	10	--	----
6	3076.92	9	10	--	----
7	*0.00	N/A	N/A	--	----

*For the purposes of this documentation record, it was assumed that the area of Source №s 4 and 7 are greater than 0, therefore 0 was added in as the Source Hazardous Waste Quantities (HWQ).

Sum: 14,426.57
Hazardous Waste Quantity Factor Value: 10,000
Reference(s): 1, Table 2-5, Table 2-6, Table 3-2, Table 4-2

3.0 GROUNDWATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

There are three Aquifer systems present throughout the Brunswick area. These Aquifer systems are, in descending order, the Surficial Aquifer system, the Miocene Aquifer System, and the Floridan Aquifer system (Ref. 37, p.53).

The Surficial Aquifer system is comprised of recent to Miocene age deposits and appears to be between 180 and 190 feet thick beneath the LCP Chemical facility (Ref. 37, p.19, Plate 2). The upper portions of the Surficial Aquifer system are Post Miocene in age and are composed of interlayered sand, clay, and thin limestone beds (Ref. 37, p.19). The lower section consists of Miocene age sand which rests upon Miocene age carbonate rocks (Ref. 37, p.19). Boring logs at the LCP Chemical facility identify the presence of a surficial veneer of fine silty sand fill material to a depth of 5 feet below land surface (Ref. 39, p.6). The fill material rests upon fine to medium loose to very firm sand to a depth of 48 feet below land surface datum (blsd) (Ref. 39, p.6). Below 48 feet to the completion of the boring (55 feet blsd), sediments graded from a soft gray silty clay to a very hard grey clayey fine sandy silt (Ref. 39, p.6). The Surficial Aquifer is typically unconfined; however, discontinuous layers of clay such as those encountered in the on-site boring, often create local confined or semi-confined conditions in the lower portion of the aquifer (Refs. 37, p. 19, 53; 39, p. 6). These clay layers range from five to 40 feet in thickness (Ref. 37, p. 19). Aquifer tests conducted in Brunswick indicate that the deeper portions of the Surficial Aquifer system are confined or semi-confined (Ref. 37, p.19). The base of the Surficial Aquifer system is a dense phosphatic limestone or dolomite which creates a confining layer which is approximately 70 feet thick in a well located approximately 1.75 miles south of the LCP Chemical facility (Refs. 3; 37, p. 35, Plate 2).

The Surficial Aquifer System is separated from the underlying Miocene Aquifer System by an unconformity within Miocene age sediments (Ref. 37, p. 11). The Miocene Aquifer System has been divided into upper and lower aquifers separated by a confining layer consisting of silty clay and dense phosphatic carbonates (Ref. 37, p. 35). These aquifers are each approximately 75 feet thick, and are designated as the Upper and Lower Brunswick Aquifers, respectively (Ref. 37, Plate 2). Sediments within the Upper Brunswick Aquifer consist of poorly sorted, fine to coarse, quartz sand which is slightly phosphatic and dolomitic (Ref. 37, p.26). The Lower Brunswick Aquifer is bounded above and below by an unconformity, and is similarly comprised of poorly sorted, fine to coarse, phosphatic and slightly dolomitic sand (Ref. 37, p.26). The confining unit which separates the Upper and Lower Brunswick Aquifers is documented to be approximately 50 feet thick within the study area (Ref. 37, p.35, Plate 2). An additional confining layer which is part of, and constitutes the base (lower confining unit) of, the Miocene Aquifer System is documented to be approximately 30 feet thick in Brunswick (Ref. 37, Plate 2). This confining unit is comprised of silty clay and dense phosphatic carbonate rocks and separates the Lower Brunswick Aquifer from the underlying Floridan Aquifer System (Ref. 37, p. 35).

Well 33H194, located approximately one mile north-northwest of LCP Chemicals is 180 feet deep and screened in the surficial aquifer (Refs. 3; 37, p. 79; 38, pp. 1-2; 42). This well is a private domestic well currently in use (Ref. 42). Therefore, for the purposes of this documentation record, the surficial aquifer was evaluated.

The Floridan Aquifer System rests beneath the Miocene Aquifer System and, although hydraulically interconnected, has been divided into the Upper Floridan and Lower Floridan Aquifers, respectively (Ref. 37, p.29).

The top of the Upper Floridan Aquifer is marked by and includes Oligocene age carbonate rocks (Ref. 37, pp. 10, 11, 29). These carbonates are described as porous, micritic, and fossiliferous limestone which is phosphatic in the Brunswick area (Ref. 37, pp. 10, 11, 29).

The remaining portions of the Upper Floridan Aquifer are primarily Upper Eocene in age with a lower permeable zone which extends downward into the Middle Eocene age units (Ref. 37, Plate 3). The carbonate rocks within the Upper Floridan Aquifer are documented to exhibit karst characterics in the Brunswick area (Ref. 37, p. 31). The Upper Floridan Aquifer is approximately 460 feet thick in Brunswick and contains two distinctive freshwater permeable zones (Ref 37, pp. 29, 30). The thickness of the upper freshwater permeable zone ranges from 85 to 180 feet thick, and the lower zone typically ranges from 15 to 110 feet in thickness (Ref. 37, p. 30). A zone of lower permeability which partially restricts movement of groundwater separates the two permeable zones and ranges from 150 to 200 feet thick (Ref. 37, p. 30). Rocks of Upper Eocene age (also known as the Ocala Group) are typically massive, fossiliferous limestones which unconformably overlies the dolomite and limestones of Middle Eocene age (also known as the Avon Park Formation) rocks (Ref. 37, p. 10, Plate 3).

A dense dolomitic limestone approximately 40 feet thick in the Brunswick area forms a semi-confining unit separating the Upper Floridan Aquifer from the Lower Floridan Aquifer (Ref. 37, p. 38). Although the Lower Floridan Aquifer is a viable source for groundwater; currently it is not utilized in the Brunswick area (Ref. 37, p. 35).

The water table gradient controls the groundwater flow direction in the Surficial Aquifer, and is normally relatively flat in the Brunswick area (Ref. 37, p. 22). In Brunswick, groundwater flow in the Surficial Aquifer is somewhat influenced by local pumping and tidal changes (Ref 37, pp. 22, 24). Groundwater within the Surficial Aquifer likely flows westward towards the Turtle River (Refs. 3; 37, p. 22). Groundwater in the Upper Floridan Aquifer regionally flows northeastward towards the Atlantic Ocean; however, the flow direction is towards pumping centers in the Brunswick area (Ref. 37, p. 42, Figure 12). Little information is available concerning groundwater flow within the Brunswick Aquifers; although, it is likely to share similar traits with the Upper Floridan Aquifer and flow towards centers of pumping (Ref. 37, pp. 28-29).

The confining units separating the Surficial Aquifer from the underlying Brunswick and Upper Floridan Aquifers are not impermeable, and allow some interchange of groundwater to occur (Ref. 37, p. 42). This is enhanced in Brunswick, by local pumping of the Upper Floridan Aquifer (Ref. 37, p. 42). It has been estimated that 2 gallons per acre per day of leakage occurs between the Surficial Aquifer and the Upper Brunswick Aquifer within three miles of the LCP Chemical facility (Ref. 37, p. 43, Plates 1, 2). Groundwater flow between the Surficial Aquifer and Upper Floridan Aquifer also occurs in Brunswick, both from the Surficial Aquifer downward into the Upper Floridan Aquifer and conversely, due to artesian pressure in the Upper Floridan Aquifer (Ref. 37, pp. 41, 42). A high potential for leakage from the Surficial Aquifer into the Upper Floridan Aquifer exists due to the large, downward hydraulic gradient induced by local pumping (Ref. 37, p. 42).

3.1. LIKELIHOOD OF RELEASE

3.1.1. OBSERVED RELEASE

This site was evaluated and scored on the Potential to Release Component to groundwater due to the large number of targets in the deep aquifer. However, it was also evaluated on the Observed Release Component since contaminants were found at levels greater than three times the background in the surficial aquifer. The evaluation for observed release was used to show that certain contaminants at this site have a groundwater mobility of 1 (Ref. 1, Section 3.2.1.2).

Aquifer Being Evaluated: Surficial/Miocene

Chemical Analysis:

- Background Concentration

Sample ID	Depth	Date	Reference
LCP-TW-01	9.5 ft. bls	04/28/89	7, p. 31

Sample ID	Hazardous Substance	(µg/l) Concentration	(µg/l) Sample Quantitation Limit (SQL)*	Reference
LCP-TW-01	Barium	--	280	4, App. G, p. 313
(Groundwater)	Chromium	98	10	4, App. G, p. 313; 33, p. C-1
	Cobalt	--	20	4, App. G, p. 313
	Copper	--	25	4, App. G, p. 313
	Lead	--	50UJ	4, App. G, p. 313
	Manganese	49	15	4, App. G, p. 313; 33, p. C-1
	Mercury	1	0.2	4, App. G, p. 313; 33, p. C-1
	Nickel	--	25	4, App. G, p. 313
	Vanadium	85	50	4, App. G, p. 313; 33, p. C-1
	Zinc	390J	20	4, App. G, p. 313; 33, p. C-1
	Cyanide	--	.01UJ (mg/l)	4, App. G, p. 369

* When no Sample Quantitation Limit (SQL) can be determined, the Contract Required Quantitation Limit is used. CRQLs are listed when a concentration is given in the concentration column. If no figure is listed in the concentration column, then the SQL is listed. See Ref. 33.

- Contaminated Samples

Sample ID	Depth	Date	Reference
LCP-TW-04	8-9 ft. bls	04/26/89	7A, pp. 5, 6
LCP-TW-05	Not Documented	04/26/89	7A, pp. 5, 6
LCP-TW-06	12 ft. bls	04/27/89	6, p. 25
LCP-TW-07	4.5-7 ft. bls	04/27/89	7, p. 26

Sample ID	Hazardous Substance	Concentration (µg/l)	Contract Required Quantitation Limit (CRQL)* (µg/l)	Reference
LCP-TW-04 (Groundwater)	Barium Lead Manganese Mercury Zinc	4900 2500 570 120 3300J	200 3 15 0.2 20	4, App. G, p. 314; 33, p. C-13
LCP-TW-05 (Groundwater)	Barium Copper Lead Manganese Mercury Nickel	8800 450 220 430 540J 680	200 25 3 15 0.2 40	4, App. G, p. 315; 33, p. C-13
LCP-TW-06 (Groundwater)	Chromium Cobalt Copper Lead Manganese Mercury Nickel Vanadium Zinc	1800 80 1100 1700 560 24,000 330 470 1700J	10 50 25 3 15 0.2 40 50 20	4, App. G, p. 316; 33, p. C-13
LCP-TW-07 (Groundwater)	Manganese Zinc	370 93J	15 20	4, App. G, p. 317; 33, p. C-13

* When no Sample Quantitation Limit (SQL) can be determined, the Contract Required Quantitation Limit is used. CRQLs are listed when a concentration is given in the concentration column. See Ref. 33.

- Level I Samples

No groundwater Level I samples were observed at the site.

==========

Ground Water Observed Release Factor Value: N/A

Attribution:

LCP Chemicals produces chlorine using a mercury cell process. On May 15, 1981, LCP sent an amended application, which includes a K106 (wastewater treatment sludge from a mercury cell process in chlorine production), to the Georgia Department of Natural Resources Environmental Protection Division. An internal plant process is used to recover mercury from the sludge (Ref. 15). Wastes containing mercury and caustic materials were disposed on-site (Ref. 16).

The site was originally owned and operated by the Atlantic Refining Company who operated a petroleum refinery from 1919 until 1930. The site was also owned by Georgia Power Company and the Dixie O'Brien Paint Company. In 1955, the entire property was purchased by Allied Chemical, Inc. who manufactured caustic soda (NaOH), chlorine (CL_2), and hydrochloric acid (HCL) by the electrolysis of sodium chloride (NaCl) using mercury cells. In 1979, LCP Chemicals purchased the property and continued the process practiced by Allied Chemical. From 1955 until 1968, waste sludge containing mercury produced by Allied Chemical were sold to an off-site reclaimer. From 1968 until the facility was sold to LCP Chemicals, several hundred to several thousand tons of contaminated sludge were disposed in surface impoundments that were constructed on-site along the tidal marsh (Ref. 18, pp. 1, 3, 7-8).

The mercury-cell process involves the use of two cells. In the brine cell (primary electrolyzer), purified, saturated brine flows through an elongated trough that is inclined slightly from the horizontal. In the bottom of this trough a shallow sheet of mercury, the cathode, flows concurrently with the brine. Above the cathode, an anode assembly is suspended which consists of blocks of graphite. Current flowing through the cell decomposes the brine that is passing through the narrow space between the electrodes. This liberates chlorine gas at the anode and sodium metal at the cathode. The chlorine gas is accumulated above the anode assembly and discharged to the purification process (Ref. 17, p. 807).

As it is liberated at the surface of the mercury cathode, the sodium immediately forms an amalgam which eliminates the reaction with water in the brine to form caustic soda and hydrogen, and eliminates a reaction with dissolved chlorine. A low concentration amalgam of sodium is formed in the mercury cathode (Ref. 17, pp. 807, 808).

The amalgam leaves the brine cell (electrolyzer) and is fed to a separate reactor (decomposer or soda cell) where it reacts with water. Using countercurrent flow, the amalgam flows in one direction and the deionized water flows in the opposite direction. The mercury cell operation depends on the higher overpotential of hydrogen vs. mercury to achieve the preferential release of sodium rather than hydrogen (Ref. 17, p. 808).

An "end box" is attached to each end of the electrolyzer which incorporates compartments for the chlorine gas, separating the mercury and brine streams. This procedure washes the mercury and permits the removal of thick mercury "butter" (sludge) that is formed by impurities. This butter moves sluggishly down the electrolyzer trough and can accumulate to the point where it shorts the anode to the cathode (Ref. 17, p. 811).

The mercury used in a mercury cell represents a significant portion (10-15%) of the total investment in the cell. Prior to government regulation, mercury losses from mercury-cell plants ranged from 135 to 225 grams per ton of chlorine. At the operating temperatures of electrolyzers and decomposers, mercury has a measurable vapor pressure. Even with cooling,

mercury is lost in the product and waste streams from a plant. According to the Encyclopedia of Chemical Technology, Third Edition, Volume 1 (Reference 17), recent EPA regulations limit effluent discharge to 0.28 grams of mercury per metric ton of product for existing plants, with an additional 50% reduction for new plants (Ref. 17, p. 811).

During the week of April 24, 1989, NUS Corporation conducted a field sampling investigation at LCP Chemicals (Ref. 4, p. 1). Environmental sampling consisted of 11 surface soil, 9 subsurface soil, 24 sediment, 3 surface water, 8 groundwater, 2 lithologic, and 29 air samples (Ref. 4, p. 20). Mercury was found in all seven sources on site (see pages 18, 22, 26-27, 30-31, 34-35, 38, 41-42 of this documentation record). Mercury was detected in sources at levels greater than three times background or greater than the sample quantitation limit in sediment, subsurface, surface soil, and surface water samples (Ref. 4, App. G, pp. 268-320). (Backgrounds for these media are found respectively on pages 268, 290, 299, and 318 of Ref. 4, App. G). Mercury was also found in groundwater samples at levels greater than three times background or greater than the sample quantitation limit; these concentrations were found in LCP-TW-04, 05, and 06. The concentration of mercury in LCP-TW-06 was 24,000 times the background level (Ref. 4, App. G, pp. 313, 314, 315, 316).

After World War II, the Dixie O'Brien Paint Company purchased a portion of the facility. Little is known of the types of wastes generated by the Dixie O'Brien Paint Company (Ref. 18, p. 1). However it can be reasonably assumed that paint was produced or stored on the property. Lead was sometimes used in paints.

Sampling results from the NUS investigation revealed the presence of lead in six of the seven sources used to evaluate the LCP facility (see pages 18, 22, 26-27, 30-31, 34-35, 38, 41-42 of this documentation record). Lead was detected in sources at levels greater than three times background or greater than the sample quantitation limit in sediment, subsurface, surface soil, and surface water samples (Ref. 4, App. G. pp. 268-320). (Backgrounds for these media are found respectively on pages 268, 290, 299, and 318 of Ref. 4, App. G). Lead was also found in groundwater samples at levels greater than three times background or greater than the sample quantitation limit; these concentrations were found in LCP-TW-04, 05, and 06. The concentration of lead in LCP-TW-04 was 50 times the sample quantitation limit of the background (Ref. 4, App. G, pp. 313, 314, 315, 316). Mercury and lead were discussed in detail since they were the most prevalent in sources and groundwater, however, several other contaminants were also detected at elevated concentrations, and are listed below.

Hazardous Substances Released:
Barium
Chromium
Cobalt
Copper
Lead
Manganese
Mercury
Nickel
Vanadium
Zinc

==========

Ground Water Observed Release Factor Value: N/A

3.1.2. POTENTIAL TO RELEASE

3.1.2.1. Containment

Source	Description	Value
South Settlement Tank	Surface Impoundment	9
North Settlement Tank	Surface Impoundment	9
North Disposal Area	Landfill	10
Allied Disposal Area	Landfill	N/A
Brine Impoundment	Surface Impoundment	9
Waste Impoundment	Surface Impoundment	9
Mercury Retort Area	Contaminated Soil	N/A

Evidence exists showing contamination of the groundwater due to hazardous substance migration from these sources at LCP Chemicals (Ref. 4, App. G, pp. 313-316).

==========

Contaminant Factor Value: 10

3.1.2.2. Net Precipitation

Precipitation (in inches): 7 (net)

References: 1, Table 3-4, Figure 3-2; 10

Factor Value: 3

3.1.2.3 Depth to Aquifer UPPER FLORIDAN

The depth to the Upper Floridan Aquifer was calculated due to the large number of targets in this deep aquifer.

Location	Stratum	(Top of Stratum) Depth (in feet)	(Bottom of Stratum) Cumulative Depth	Reference(s)
LCP Chemicals	Fine to medium loose to very firm sand	0	48	39, p. 6
LCP Chemicals	Locally, (at the facility) silty clay grading to clayey silt	48	unknown thickness	37, p. 19; 39, p. 6
	Arkosic sand and gravel with discontinuous clay beds consisting of coquina and coarse sand	unknown	180	37, p. 14
	Miocene aged dense phosphatic limestone or dolomite	180	250	37, p. 35, Plate 2
	Poorly sorted, fine to coarse, phosphatic and slightly dolomitic sand	250	325	37, Plate 2
	Silty clay and dense phosphatic limestone or dolomite	325	375	37, p. 35, Plate 2
	Poorly sorted, fine to coarse, phosphatic sand	375	450	37, p.26, Plate 2

	Silty clay and dense phosphatic carbonate rocks	450	480	37, p. 35, Plate 2

The Oligocene Limestone is above the Ocala Limestone, and they are hydraulically connected. The Oligocene Series is part of the principal artesian aquifer (Upper Floridan)(Ref. 9, p. E11, Plate 1).

Contaminants were found as deep as 12 feet bls in sample LCP-TW-06 (Ref. 6, p. 25). Therefore, the interval between the lowest known point of contamination and the top of the Upper Floridan Aquifer is approximately 468 feet.

==========

Net Precipitation Factor Value: 3
Depth to Aquifer Factor Value: 1

3.1.2.4. Travel Time

Layer	Composition	Thickness (feet)	Conductivity (cm/sec)	Reference(s)
Upper Portion of the Surficial Aquifer	Fine to medium loose to very firm sand.	48	7.06 X 10^{-4} to 2.29 X 10^{-2}	37, p. 21; 39, p. 6
Local Confining layer of the Surficial Aquifer	Sediments graded from a soft gray silty clay to a very hard clayey fine sandy silt.	Locally, a minimum of 5	3.96 X 10^{-3} to 1.62 X 10^{-3}	37, p. 37; 38, p. 2
Lower Portion of the Surficial Aquifer	Arkosic sand and gravel with discontinuous clay beds consisting of coquina and coarse sand.	> 40	2.7 X 10^{-5} to 1.31 X 10^{-2}, based on the Surficial Aquifer being 180 feet thick 1.4 X 10^{-2} to 1.4 X 10^{-1} in the lower semiconfined section	37, pp. 14, 21
Confining Unit Separating the Surficial Aquifer from the Upper Brunswick Aquifer.	Miocene age dense phosphatic limestone or dolomite.	70	1.8 X 10^{-8} to 4.6 X 10^{-8}	37, p. 35
Upper Brunswick Aquifer	Poorly sorted, fine to coarse, quartz sand which is slightly phosphatic and dolomitic.	75	1.33 X 10^{-2}	37, pp. 26-27, Plate 2
Confining Unit Separating the Upper and Lower Brunswick Aquifers	Silty clay and dense phosphatic limestone or dolomite.	50	1.87 X 10^{-8} to 4.59 X 10^{-8}	37, p. 35, Plate 2
Lower Brunswick Aquifer	Poorly sorted fine to coarse, phosphatic and slightly dolomitic sand.	75	7.06 X 10^{-3} to 1.41 X 10^{-2}	37, pp. 26-27, Plate 2
Confining Unit Separating the Lower Brunswick Aquifer from the Upper Floridan Aquifer.	Silty clay and dense phosphatic carbonate rocks.	30	3.78 X 10^{-6} to 6.14 X 10^{-4}	37, pp. 30, 35, Plate 2

Lowest Hydraulic Conductivity: 10^{-8}

Travel time was calculated using a combined thickness of approximately 120 feet for the layers with the lowest hydraulic conductivity. This includes

the confining unit separating the surficial aquifer from the upper Brunswick aquifer (70 feet), in addition to the confining unit separating the upper and lower Brunswick aquifers (50 feet), since these two units exhibit similar hydraulic conductivities (Ref. 37, p. 35). The lowest hydraulic conductivity is approximately 10^{-8} cm/sec. This results in a travel time factor value of 1 (Refs. 1, Table 3-7; 37, p. 35).

==========

Travel Time Factor Value: 1

3.2. WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

Hazardous Substance	Source Number	Toxicity Factor Value	Mobility Factor Value	Toxicity/ Mobility	References
Anthracene	3	10	2.0E-07	2.0E-06	1; 2, p. B-2
Barium	4,5	10,000	*1	10,000	1; 2, p. B-2
Benzo(A)Anthracene	3,4,7	1000	2.0E-09	2.0E-06	1; 2, p. B-2
Benzo(A)Pyrene	4,7	10,000	2.0E-09	2.0E-05	1; 2, p. B-2
Benzoic Acid	4	1	1	1	1; 2, p. B-3
Chloroform	1,3,5	100	1	100	1; 2, p. B-4
Chromium	3,4,7	10,000	*1	10,000	1; 2, p. B-5
Cobalt	4,6	1	*1	1	1; 2, p. B-5
Copper	3,4, 7	--	*1	--	1; 2, p. B-5
Cyanide	4	100	--	--	1; 2, p. B-5
Dieldrin	7	10,000	2.0E-07	2.0E-03	1; 2, p. B-7
Ethyl benzene	3	10	1.0E-02	0.1	1; 2, p. B-9
Hexachlorobenzene	5	1000	2.0E-07	2.0E-04	1; 2, p. B-10
Hexachloroethane	5	1000	2.0E-03	2	1; 2, p. B-10
Lead	1,2,3,4,5,7	10,000	*1	10,000	1; 2, p. B-11
Manganese	4,5	10,000	*1	10,000	1; 2, p. B-11
Mercury	1,2,3,4,5,6,7	10,000	*1	10,000	1; 2, p. B-11
Naphthalene	3	1	2.0E-03	2.0E-03	1; 2, p. B-12
Nickel	4,7	100	*1	100	1; 2, p. B-12
PCB-1254	1	10,000	1.0E-04 +	1	1; 2, p. B-13
PCB-1260	1	10,000	1.0E-04 +	1	1; 2, p. B-13
Phenanthrene	3,4	--	2.0E-05	--	1; 2, p. B-14
Pyrene	3,4	100	2.0E-09	2.0E-07	1; 2, p. B-15
Tetrachloroethene	1,5,7	100	1.0E-02	1	1; 2, p. B-16
Toluene	3,7	10	1.0E-02	0.1	1; 2, p. B-16
Trichloroethene	1,5	10	1.0E-02	0.1	1; 2, p. B-17
Xylene (Total)	3	1	1.0E-02	1.0E-02	1; 2, p. B-18
Zinc	1,3,4,5,6,7	10	*1	10	1; 2, p. B-18

* Found at levels 3 times background or greater than the SQL in the surficial aquifer. Therefore the mobility factor value equals 1 (Ref. 1, Section 3.2.1.2.). See Section 3.1.1.
+ PCB-1254 and PCB-1260 were evaluated as liquids.

==========

Toxicity/Mobility Factor Value: 10,000

3.2.2. Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5)	Is source hazardous constituent quantity data complete? (yes/no)
1	646.15	No
2	738.46	No
3	3.50	No
4	*0.00	No
5	9961.54	No
6	3076.92	No
7	*0.00	No

Sum of Values: 14,426.57

*For the purposes of this documentation record, it was assumed that the area of source №s 4 and 7 are greater than 0, therefore 0 was added in as the Source Hazardous Waste Quantities (HWQ's).

3.2.3. Waste Characteristics Factor Category Value

Hazardous Waste Quantity Factor Value (Ref. 1, Table 2-6): 10,000
Toxicity/Mobility Factor Value: 10,000
Toxicity/Mobility Factor Value X Hazardous Waste Quantity Factor Value:
10,000 x 10,000 = 1.0 E+08

Applied to Ref. 1, Table 2-7 yields a Waste Characteristics Factor Category Value of: 100

==========

Waste Characteristics Factor Category Value: 100

3.3. TARGETS

Six municipal wells are used by the Brunswick Water Department to serve approximately 11,000 connections. All six of these wells are located within a 4-mile radius of the site (Refs. 3; 20; 22; 23; 24). The water is drawn from the deep aquifer (Upper Floridan) and blended to some extent in the pipes. Therefore each well serves 1833 (11,000 ÷ 6) connections or 4711 (1833 x 2.57) people using a conversion factor of 2.57 persons per household based on 1990 U.S. Census data for Glynn County (Refs. 20; 21). Two other Brunswick Water Department municipal wells within 4-miles of the site serve a total of 225 connections or 578 people. These wells do not pump at the same time; they alternate daily so one well serves all 578 people on a given day, and the next day the other well serves the same 578 people. Both draw water from the deep aquifer (Refs. 20; 21). One well is located ½ to 1 mile from the site , one from 1 to 2 miles, four from 2 to 3 miles, and two from 3 to 4 miles (Refs. 3; 20; 22).

The Glynn County Water Department also serves customers in the Brunswick area, however the wells used by this system are located approximately 8 miles north of the center of Brunswick. Water is not blended in any manner between the two systems (Ref. 23). (Note: Small discrepancies in the exact number of connections served by the Brunswick Water Department and gallons pumped per day exist between references 20 and 23. Any differences are clearly explained in Ref. 24).

Areas that are not served by either of these systems use private wells drilled at a wide range of depths. The number of private wells was derived from the U.S.G.S. topographic map and information from the Brunswick Water Department by estimating the number of households not served by the waterlines. Approximately 1971 residences or 5065 residents are served by private wells (Refs. 3; 20; 22; 23).

Well 33H194, located approximately one mile north-northwest of LCP Chemicals is 180 feet deep and screened in the surficial aquifer (Refs. 3; 37, p. 79; 38, pp. 1-2; 42). This well is a private domestic well currently in use (Ref. 42). Therefore, for the purposes of this documentation record, the surficial aquifer was evaluated.

All wells within the 4-mile radius of LCP Chemicals are evaluated on the basis of potential contamination.

Well Type	Distance from Source	Population Served				
	Mile	№ of Houses		Persons Per Household (Glynn Co. Census)		People Served
Private	0 - ¼	0	x	2.57	=	0
Private	¼ - ½	57	x	2.57	=	146
Private	½ - 1	191	x	2.57	=	491
Private	1-2	798	x	2.57	=	2051
Private	2-3	667	x	2.57	=	1714
Private	3-4	258	x	2.57	=	663

Well Type	Distance from Source	Population Served						
	Mile	Nº of Wells		Nº of Connections Served by Well		Persons Per Household (Glynn Co. Census)		People Served
Brunswick Municipal System	0 - ¼	0	x	0	x	0	=	0
Brunswick Municipal System	¼ - ½	0	x	0	x	0	=	0
Brunswick Municipal System	½ - 1	1	x	1833	x	2.57	=	4711
Brunswick Municipal System	1-2	1	x	1833	x	2.57	=	4711
Brunswick Municipal System	2-3	2	x	1833	x	2.57	=	9422
Brunswick Municipal System	2-3	*2	x	112.5	x	2.57	=	578
Brunswick Municipal System	3-4	2	x	1833	x	2.57	=	9422

* These two wells alternate on a daily basis. 225 connections are served by <u>one</u> well on a given day, while the other well serves all 225 connections the next day (Ref. 20). These two wells are not blended with the additional six wells that make up the Brunswick Municipal System (Ref. 20).

The deep (Floridan Aquifer) is the aquifer being evaluated, hence the likelihood of release used will be for that aquifer. Targets do exist, however, above the Floridan Aquifer, so all populations (private and municipal) in the Floridan and all populations above it are summed (Ref. 1, Section 3.0).

3.3.1. Nearest Well

Well:
Level of Contamination (I, II, or potential): Potential
If potential contamination, distance from source in miles:

Private wells are located immediately north of the site on Deloach Street and Fader Lane. The nearest well is approximately 1400 feet or 0.265 miles NNE of the waste disposal impoundment (Source 6) and north settlement tank (Source 2) (Refs. 1, Table 3-11; 3; 22; 25, pp. 8, 9).

A value of 20 (karst) was assigned as a nearest well value based on Refs. 1, Section 3.3.1; 37, pp. 29, 31).

==========

Nearest Well Factor Value: 20

3.3.2.4. Potential Contamination

Distance Category	Population: Private Wells[A]		Municipal Wells[B]		Total	Reference	Distance-Weighted Population Value[C]
0 - ¼	0	+	0	=	0	3; 23; 25, pp. 7, 8	0
¼ - ½	146	+	0	=	146	3; 21; 23; 25, pp. 7, 8	102
½ - 1	491	+	4711	=	491 + 4,711	3; 21; 23; 25, pp.7, 8	167 + 2,607 = 2,774
1 -2	2051	+	4711	=	2,051 + 4,711	3; 21; 23; 25, pp. 7, 8	294 + 2,607 = 2,901
2 -3	1714	+	10,000	=	1,714 + 10,000	3; 21; 23; 25, pp. 7, 8	212 + 2,607 = 2,819
3 -4	663	+	9422	=	663 + 9,422	3; 21; 23; 25, pp. 7, 8	42 + 2,607 = 2,649

Sum of Distance-Weighted Population Values: 11,245
Reference 1, Table 3-12

[A] The Distance-Weighted Population Values for the private well populations utilized non-karst values since it was not possible to document the depth of all private wells.

[B] The Distance-Weighted Population Values for these distance categories utilized karst values since the municipal wells are drilled into the karst Upper Floridan aquifer (Refs. 20; 23; 37, p. 31).

[The] Distance-Weighted Population Values for both the non-karst populations and the karst populations were added together to get a total as per Reference 1, Section 3.3.2.4.

==========

Potential Contamination factor Value: 1,125

3.3.3. RESOURCES

The Cumberland Gas and Ice plant, located approximately three miles south-southeast of LCP Chemicals, utilizes two wells for the production of ice for human consumption (Refs. 3; 34).

==========

Resources Factor Value: 5

3.3.4. WELLHEAD PROTECTION AREA

No wellhead protection areas are known to exist within a 4-mile radius of the site.

==========

Wellhead Protection Area factor Value: 0

4.1. OVERLAND/FLOOD MIGRATION COMPONENT

4.1.1.1. DEFINITION OF HAZARDOUS SUBSTANCE MIGRATION PATH FOR OVER--LAND/FLOOD COMPONENT

Most runoff flows off of the western edge of the facility into a canal which flows approximately 0.35 mile through an area of wetlands. This canal converges with Purvis Creek which flows 0.9 mile south-southwest before it empties into the Turtle River. Some of the runoff also flows directly through the wetlands and enters Purvis Creek, and then the Turtle River which flows 7.5 miles southeast before turning into the Brunswick River. This flows approximately 5 miles east before emptying into the Atlantic Ocean for the remaining 1.25 miles of the 15 mile pathway (Refs. 3; 25A).

4.1.2.1. LIKELIHOOD OF RELEASE

4.1.2.1.1. Observed Release

Chemical Analysis

- Background Concentration

Sample ID	Sampling Location	Depth	Date	Reference
LCP-SD-01 4-25-89 (Sediment)	1.5 miles North of facility	6-12"	4-25-89	4, App. B, Table B-4; 7A, p. 5; 41
WQ-4367 12-19-91 (Water)	1.3 Miles Upstream of Turtle River on Purvis Creek	ND	12-19-91	26, pp. 30, A-75
WQ-2267 6-26-91 (Sediment)	1.3 Miles Upstream of Turtle River on Purvis Creek	ND	6-26-91	26, pp. 30, A-49 through A-52
WQ-2984 8-21-91 (Sediment)	1.3 Miles Upstream of Turtle River on Purvis Creek	ND	8-21-91	26, pp. 30, A-60 through A-63

ND Not Documented
NA Not Applicable

NOTE: Throughout Section 4 of this documentation record, Ref. 26 is referred to. Page 21 of this reference is a map showing the sampling locations. A copy of this map is shown on pages 5 and 5a of this documentation record.

Sample ID	Hazardous Substance	Concentration	Sample Quantitation Limit*	Reference(s)
LCP-SD-01 4-25-89 (Sediment)	Barium Cobalt Copper Lead Mercury Nickel Pyrene Zinc	-- -- -- 29 mg/kg 3.4 mg/kg -- -- 63J mg/kg	20U mg/kg 2.7 mg/kg 30J mg/kg 0.6 mg/kg 0.1 mg/kg 20 mg/kg .97 mg/kg 4 mg/kg	4, App. G, p. 268; 33, p. C-13
WQ-4367 12-19-91 (Water)	Lead Mercury	-- --	10 µg/l 0.2 µg/l	26, pp. 30, A-75
WQ-2267 6-26-91 (Sediment)	Lead Mercury PCBs	54 mg/kg 4.2 mg/kg 10 mg/kg	0.6 mg/kg 0.1 mg/kg **	26, pp. 30, 33, A-49, A-52; 33, pp. C-8, C-13
WQ-2984 8-21-91 (Sediment)	Lead Mercury PCBs	10 mg/kg 1.3 mg/kg 1.24 mg/kg	0.6 mg/kg 0.1 mg/kg **	26, pp. 30, 33, A-60, A-63; 33, pp. C-8, C-13

U -- Undetected at the sample quantitation limit.
J -- Estimated value.
* -- CRQLs are listed when a figure is given in the concentration column. Otherwise the SQL is listed.
**-- A CRQL value is not specified for Aroclor-1268 (PCB), however all other Aroclors have values of .033 or .067 mg/kg.

CONTAMINATED SAMPLES

Sample ID	Sample Location	(bls) Depth	Date	Reference
LCP-SD-04 (Sediment)	Eastern Edge of Wetlands Near Western Edge of Facility	5" - 12"	04-25-89	7, pp. 14, 15
LCP-SD-05 (Sediment)	Eastern Edge of Wetlands Near Western Edge of Facility	6" - 14"	04-25-89	7, p. 14
LCP-SD-07 (Sediment)	Eastern Edge of Wetlands Near Western Edge of Facility	6" - 14"	04-25-89	7, pp. 13, 14
LCP-SD-12 (Sediment)	Eastern Edge of Wetlands Near Western Edge of Facility	4" - 10"	04-25-89	7, p. 9
LCP-SD-13 (Sediment)	Eastern Edge of Wetlands Near Western Edge of Facility	8" - 20"	04-25-89	7, pp. 8, 9
WQ-4366 12-19-91 (Water)	Mouth of Tributary to Purvis Creek	ND	12-19-91	26, pp. 22, A-72
WQ-4368 12-19-91 (Water)	0.1 Mile Upstream of Turtle River on Purvis Creek	ND	12-19-91	26, pp. 26, A-71
WQ-2265 6-26-91 (Sediment)	Mouth of Tributary to Purvis Creek	ND	06-26-91	26, pp. 25, A-46
WQ-2266 6-26-91 (Sediment)	0.1 Mile Upstream of Turtle River on Purvis Creek	ND	06-26-91	26, pp. 29, A-42
WQ-2986 8-21-91 (Sediment)	Mouth of Tributary to Purvis Creek	ND	08-21-91	26, pp. 22, 25, A-56, A-59
WQ-2983 8-21-91 (Sediment)	0.1 Mile Upstream of Turtle River on Purvis Creek	ND	08-21-91	26, pp. 29, A-55

Sample ID	Hazardous Substance	Concentration	Contract Required Quantitation Limit (CRQL)	Reference
LCP-SD-04 (Sediment)	Barium Cobalt Copper Lead Nickel Pyrene Zinc	470 mg/kg 5.9 mg/kg 52J mg/kg 2400 mg/kg 24 mg/kg 4.1 mg/kg 530J mg/kg	40 mg/kg 10 mg/kg 5 mg/kg 0.6 mg/kg 8 mg/kg .330 mg/kg 4 mg/kg	4, App. G, pp. 17, 271; 33, pp. C-5, C-13
LCP-SD-05 (Sediment)	Copper Lead Nickel Zinc	57J mg/kg 250 mg/kg 21 mg/kg 280J mg/kg	5 mg/kg 0.6 mg/kg 8 mg/kg 4 mg/kg	4, App. G, p. 272; 33, p. C-13
LCP-SD-07 (Sediment)	Copper Lead Nickel	58J mg/kg 180 mg/kg 21 mg/kg	5 mg/kg 0.6 mg/kg 8 mg/kg	4, App. G, p. 274; 33, p. C-13
LCP-SD-12 (Sediment)	Copper Lead Mercury	50J mg/kg 300 mg/kg 85 mg/kg	5 mg/kg 0.6 mg/kg 0.1 mg/kg	4, App. G, p. 279; 33, p. C-13
LCP-SD-13 (Sediment)	Mercury Nickel	40 mg/kg 21 mg/kg	0.1 mg/kg 8 mg/kg	4, App. G, p. 280; 33, p. C-13
WQ-4366 12-19-91 (Water)	Mercury	0.6 µg/l	0.2 µg/l	26, pp. 22, A-72; 33, p. C-13
WQ-4368 12-19-91 (Water)	Lead Mercury	100 µg/l 0.4 µg/l	3 µg/l 0.2 µg/l	*(26, pp. 22, 26), A-71; 33, p. C-13
WQ-2265 6-26-91 (Sediment)	PCBs	202 mg/kg	**	26, pp. 25, A-46; 33, p. C-8
WQ-2266 6-26-91 (Sediment)	PCBs	39 mg/kg	**	26, pp. 29, A-42; 33, p. C-8
WQ-2986 8-21-91 (Sediment)	Lead Mercury PCBs	44 mg/kg 6.9 mg/kg 63.16 mg/kg	0.6 mg/kg 0.1 mg/kg **	26, pp. 22, A-56, A-59; 33, p. C-13
WQ-2983 8-21-91 (Sediment)	PCBs	8.1 mg/kg	**	26, pp. 29, A-55; 33, p. C-8

J -- Estimated Value

* -- Reference 26, page 22, shows lead detected at a level of 100 µg/l and "N/A" on page 26. These quantities were reversed when the tables were produced. On page A-71 (raw data) lead is shown at a level of 100 µg/l for the 12-19-91 sample taken 0.1 mile upstream of the Turtle River on Purvis Creek, not for the 12-19-91 sample taken at the mouth of the tributary to Purvis Creek.

** -- A CRQL value is not specified for Aroclor-1268 (PCB), however, all other Aroclors have values of .033 or .067 mg/kg.

Attribution:

As discussed in the attribution section of groundwater in this document, mercury and lead were found in the majority of sources at LCP. Both were also found in observed releases to surface water in sediment samples. The concentration of contaminants in these samples was greater than three times background or greater than the sample quantitation limit. These elevated concentrations were found in samples LCP-SD-04, 05, 07, 12, and 13 from the NUS investigation (Ref. 4, App. G, pp. 2, 17, 268, 271, 272, 274, 279, 280). (Backgrounds for sediment samples from the NUS investigation are found on pages 2 and 268 of Ref. 4, App. G). Lead was detected in sample LCP-SD-04 at 83 times the background level, while mercury was detected in sample LCP-SD-12 at 25 times the background level.

The site was originally owned and operated by the Atlantic Refining Company who operated a petroleum refinery from 1919 until 1930. The site was also owned by Georgia Power Company and the Dixie O'Brien Paint Company. In 1955, the entire property was purchased by Allied Chemical, Inc. who manufactured caustic soda (NaOH), chlorine (CL_2), and hydrochloric acid (HCL) by the electrolysis of sodium chloride (NaCl) using mercury cells. In 1979, LCP Chemicals purchased the property and continued the process practiced by Allied Chemical. From 1955 until 1968, waste sludge containing mercury produced by Allied Chemical were sold to an off-site reclaimer. From 1968 until the facility was sold to LCP Chemicals, several hundred to several thousand tons of contaminated sludge were disposed in surface impoundments that were constructed on-site along the tidal marsh (Ref. 18, pp. 1, 3, 7-8).

Lead and mercury were also found in observed releases to surface water in sediment and surface water samples in the 1991 GAEPD/DNR investigation. Elevated concentrations were found in both of the 12-19-91 water samples and the 8-21-91 sediment sample (Ref. 26, pp. 22, 26, 30). Lead was detected in the 12-19-91 water sample at 33 times the sample quantitation limit (SQL), and mercury was 3 times the SQL. In the 8-21-91 sediment sample, lead was detected at 4.4 times the background level, and mercury was detected at 5.3 times the background level (Ref. 26, pp. 22, 30).

Mercury has been found in both crab tissue and oyster samples collected from Purvis and Turtle Creeks. (Ref. 26, pp. 22, 26, 30). LCP Chemicals was the sole source of mercury in the area (Ref. 27).

Transformers were stored and some were broken open at the LCP facility (Ref. 27). Some (21) transformers containing PCBs were disposed at Chem-Trol Pollution Services in New York (Ref. 28).

The term PCB is commonly used as an abbreviation for polychlorinated biphenyl. The majority of PCBs are mixtures of isomers of trichlorobiphenyl, tetrachlorobiphenyl, pentachlorobiphenyl, and small amounts of dichlorobiphenyl and hexachlorobiphenyl. Domestic production of PCBs was discontinued in late 1977, however they are still present in many transformers now in use. Domestic U.S. production of PCBs was stopped because of the tendency of these products to accumulate and persist in the environment due to low degradation rates, and because of toxic effects (Ref. 29, p. 844).

During the 1989 investigation of LCP Chemicals by NUS Corporation, PCBs were found in the south settlement tank (Source №: 1) at a concentration of 130,000 ug/kg (Ref. 4, App. G, p. 40). During the 1991 GAEPD/DNR investigation, PCBs were detected at levels greater than three times the background level in both of the 6-26-91 sediment samples and both of the

8-21-91 sediment samples. These levels ranged between 3.9 and 50.9 times higher than the background level (Ref. 26, pp. 25, 29, 33). An 11-20-91 crab tissue sample contained 9.9 mg/kg of PCB. (Ref. 26, pp. 25, 33).

PCBs, mercury and lead were discussed in detail since they were the most prevalent in sources and surface water, however, several other contaminants were also detected in the sources and surface water at elevated concentrations, and are listed below.

Hazardous Substances Released:

Barium
Cobalt
Copper
Lead
Mercury
Nickel
PCBs
Pyrene
Zinc

==========

Observed Release Factor Value: 550

4.1.2.1.2. POTENTIAL TO RELEASE

The criteria has been met to constitute an observed release to surface water by chemical analysis. Therefore, the potential to release component of this pathway was not evaluated.

==========

4.1.2.2. WASTE CHARACTERISTICS

4.1.2.2.1. Toxicity/Persistence

Hazardous Substance	Source Nº	Toxicity Factor Value	Toxicity/ Persistence Factor Value (Table 4-12)	Persistence Factor Value	References.
Anthracene	3	10	4	0.4	1; 2, p. B-2
Barium	4,5	10,000	10,000	1	1; 2, p. B-2
Benzo(A)Anthracene	3,4,7	1000	1000	1	1; 2, p. B-2
Benzo(A)Pyrene	4,7	10,000	10,000	1	1; 2, p. B-2
Benzoic Acid	4	1	0.4	0.4	1; 2, p. B-3
Chloroform	1,3,5	100	40	0.4	1; 2, p. B-4
Chromium	3,4,7	10,000	10,000	1	1; 2, p. B-5
Cobalt	4,6	1	1	1	1; 2, p. B-5
Copper	3,4,7	--	--	1	1; 2, p. B-5
Cyanide	4	100	40	0.4	1; 2, p. B-5
Dieldrin	7	10,000	10,000	1	1; 2, p. B-7
Ethyl Benzene	3	10	4	0.4	1; 2, p. B-9
Hexachlorobenzene	5	1000	1000	1	1; 2, p. B-10
Hexachloroethane	5	1000	400	0.4	1; 2, p. B-10
Lead	1,2,3,4,5,7	10,000	10,000	1	1; 2, p. B-11
Manganese	4,5	10,000	10,000	1	1; 2, p. B-11
Mercury	1,2,3,4,5,6,7	10,000	10,000	1	1; 2, p. B-11
Naphthalene	3	1	0.4	0.4	1; 2, p. B-12
Nickel	4,7	100	100	1	1; 2, p. B-12
PCBs	1	10,000	10,000	1	1; 2, p. B-13
Phenanthrene	3,4	--	--	0.4	1; 2, p. B-14
Pyrene	3,4	100	100	1	1; 2, p. B-15
Tetrachloroethene	1,5,7	100	40	0.4	1; 2, p. B-16
Toluene	3,7	10	4	0.4	1; 2, p. B-16
Trichloroethene	1,5	10	4	0.4	1; 2, p. B-17
Xylene (Total)	3	1	0.4	0.4	1; 2, p. B-18

Zinc	1,3,4,5,6,7	10	10	1	1; 2, p. B-18

==========

Toxicity/Persistence Factor Value: 10,000

4.1.2.2.2. Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	646.15	No
2	738.46	No
3	3.50	No
4	*0.00	No
5	9961.54	No
6	3076.92	No
7	*0.00	No

Sum of values: 14,426.57

*For the purposes of this documentation record, it was assumed that the area of Source №s 4 and 7 are greater than 0, therefore 0 was added in as the Source Hazardous Waste Quantities (HWQ's).

4.1.2.2.3. Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value (Ref. 1, Table 2-6): 10,000

Toxicity/Persistence Factor Value
x Hazardous Waste Quantity Factor Value: 1.0E + 08

Applied to Reference 1, Table 2-7 yields a Waste Characteristics Factor Category Value of: 100

==========

Hazardous Waste Quantity Factor Value: 10,000
Waste Characteristics Factor Category Value: 100

4.1.2.3. DRINKING WATER TARGETS

There are no known drinking water intakes along the surface water pathway (Ref. 23).

4.1.2.3.3. Resources

- Major or designated recreation area, excluding drinking water use

  The Turtle River in the Brunswick area is used extensively for recreational boating and fishing (Ref. 30).

==========

Resources Factor Value: 5

4.1.3.2. WASTE CHARACTERISTICS

4.1.3.2.1. Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source Nº	Toxicity Factor Value	Persistence Factor Value (Table 4-12)	Bioaccumulation* Value	Toxicity/ Persistence/ Bioaccumulation Factor Value (Table 4-16)	References
Anthracene	3	10	0.4	5000	2.0E+04	1; 2, p. B-2
Barium	4,5	10,000	1	0.5	5.0E+03	1; 2, p. B-2
Benzo(A) Anthracene	3,4,7	1000	1	50,000	5.0E+07	1; 2, p. B-2
Benzo(A)Pyrene	4,7	10,000	1	50,000	5.0E+08	1; 2, p. B-2
Benzoic Acid	4	1	0.4	5	2	1; 2, p. B-3
Chloroform	1,3,5	100	0.4	5	200	1; 2, p. B-4
Chromium	3,4,7	10,000	1	500	5.0E+06	1; 2, p. B-5
Cobalt	4,6	1	1	0.5	0.5	1; 2, p. B-5
Copper	3,4, 7	--	1	50,000	--	1; 2, p. B-5
Cyanide	4	100	0.4	0.5	20	1; 2, p. B-5
Dieldrin	7	10,000	1	50,000	5.0E+08	1; 2, p. B-7
Ethyl Benzene	3	10	0.4	50	200	1; 2, p. B-9
Hexachloro-benzene	5	1000	1	50,000	5.0E+07	1; 2, p. B-10
Hexachloroethane	5	1000	0.4	500	2.0E+05	1; 2, p. B-10
Lead	1,2,3,4,5,7	10,000	1	5,000	5.0E+07	1; 2, p. B-11
Manganese	4,5	10,000	1	0.5	5000	1; 2, p. B-11
Mercury	1,2,3,4,5,6,7	10,000	1	50,000	5.0E+08	1; 2, p. B-11
Naphthalene	3	1	0.4	500	200	1; 2, p. B-12
Nickel	4,7	100	1	500	5.0E+04	1; 2, p. B-12
PCBs	1	10,000	1	50,000	5.0E+08	1; 2, p. B-13
Phenanthrene	3,4	--	0.4	50	--	1; 2, p. B-14
Pyrene	3,4	100	1	50	5000	1; 2, p. B-15
Tetrachloroethene	1,5,7	100	0.4	50	2000	1; 2, p. B-16
Toluene	3,7	10	0.4	50	200	1; 2, p. B-16
Trichloroethene	1,5	10	0.4	50	200	1; 2, p. B-17
Xylene (Total)	3	1	0.4	500	200	1; 2, p. B-18
Zinc	1,3,4,5,6,7	10	1	50,000	5.0E+05	1; 2, p. B-18

*The Bioaccumulation Value given is the value listed for brackish water as per Refs. 1, Section 4.1.3.2.1.3; 23; 40.

==========

Toxicity/Persistence/Bioaccumulation Factor Value: 5.0E+08

4.1.3.2.2. Hazardous Waste Quantity

Source Number	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	646.15	No
2	738.46	No
3	3.50	No
4	*0.00	No
5	9961.54	No
6	3076.92	No
7	*0.00	No

Sum of values: 14,426.57

*For the purposes of this documentation record, it was assumed that the area of source Nºs 4 and 7 are greater than 0, therefore 0 was added in as the Source Hazardous Waste Quantity (HWQ).

4.1.3.2.3. Waste Characteristics Factor Category Value

Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value (Ref. 1, Table 2-6): 10,000
Bioaccumulation Potential Factor Value (Ref. 1, Section 4.1.3.2.1.3): 50,000

Toxicity/Persistence Factor Value x Hazardous Waste Quantity Factor Value: 1.0E + 08
(10,000 x 10,000 = 1.0E + 08)

(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential Factor Value: 5.0E+12
(1.0E+08 x 50,000 = 5.0E+12)

==========

Hazardous Waste Quantity Assigned Value: 10,000
Waste Characteristics Factor Category Value: 1,000

4.1.3.3. HUMAN FOOD CHAIN THREAT-TARGETS

Actual Human Food Chain Contamination

Surface Water and Sediment Samples (See map on page 5 of this documentation record for sample locations.)

Sample ID	Distance from Probable Point of Entry	Hazardous Substance	Bioaccumulation Potential Factor Value	References
WQ-4366 12-19-91 (Water)	0.38 mile	Mercury	50,000	3; 26, pp. 21, A-72; 30
WQ-4368 12-19-91 (Water)	0.60 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek	Mercury	50,000	3; 26, pp. 21, A-71; 30
WQ-2265 ✓ 6-26-91 (Sediment)	0.38 mile	PCBs	50,000	3; 26, pp. 21, A-45; 30
WQ-2986 ✓ 8-21-91 (Sediment)	0.38 mile	Mercury PCBs	50,000 50,000	3; 26, pp. 21, A-56; 30
WQ-2266 ✓ 6-26-91 (Sediment)	0.60 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek	PCBs	50,000	3; 26, pp. 21, A-41; 30
WQ-2983 ✓ 8-21-91 (Sediment)	0.60 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek	PCBs	50,000	3; 26, pp. 21, A-53; 30

Closed Fisheries

Identity of Fishery	Hazardous Substance
Purvis Creek (Refs. 26, p. 20; 30)	Mercury, PCBs
Turtle River from Hwy 303 south to the lower side of Georgia Pacific (Refs. 26, p. 20; 30).	Mercury, PCBs

Add Health Assessment

Both fisheries were closed by the Georgia Environmental Protection Division (EPD) and by the Georgia Department of Natural Resources (DNR) due to high levels of mercury and PCBs found in a GADNR investigation in 1991 (Ref. 30). Both fisheries have been closed due to mercury contamination from LCP Chemicals (Ref. 30). The fisheries remained closed at the time of this investigation. Only benthic tissue samples were collected in the Turtle river, however water, sediment, and benthic samples were collected in Purvis Creek. The water and sediment samples are shown below (Refs. 26; 30). Some mercury and PCB contamination was found upgradient of the probable point of entry in both Purvis Creek and the Turtle River. This was believed to be due to tidal influences on these water bodies, as no other source is known upstream. Even with sampling locations with upgradient contamination, which were used for control samples, numerous downgradient samples were greater than three times the background (control) (Refs. 26; 30).

Benthic Tissue Samples

Sample ID	Distance from Probable Point of Entry	Organism
WQ-0006 11-15-91 (Oyster)	0.38 mile	Oyster
WQ-0007 11-15-91 (Oyster)	1.52 miles	Oyster
WQ-0008 11-15-91 (Oyster)	0.52 mile directly through wetlands or 0.85 mile flowing through the canal and Purvis Creek.	Oyster
WQ-0009 11-15-91 (Oyster)	1.35 miles directly through wetlands, or 1.64 miles flowing through Purvis Creek into Turtle River	Oyster
WQ-0010 11-15-91 (Oyster)	0.60 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek	Oyster

Sample ID	Distance from Probable Point of Entry	Organism
WQ-0006 11-15-91 (Oyster)	0.38 mile	Oyster
WQ-0005 11-20-91 (Crab Tissue)	0.38 mile	Crab
WQ-0001 11-20-91 (Crab Tissue)	0.60 mile directly through wetlands or 1 mile flowing through the canal and purvis creek.	Crab

Sample ID	Sample Medium	Location	References
WQ-0006 ✓	Oyster	Tributary to Purvis Creek	26, pp. 22-25, A-5, A-6, A-7, A-8; 12
WQ-0007 NO QA	Oyster	Turtle River, approximately 0.5 mile upstream of Purvis Creek	26, pp. 21, 33b, A-13, A-14, A-15, A-16; 12
WQ-0008 ✓	Oyster	Purvis Creek, 1.3 miles upstream of Turtle River	26, pp. 21, A-1, A-2, A-3, A-4; 12
WQ-0009 NO QA	Oyster	Turtle River, approximately 0.5 mile downstream of Purvis Creek	26, pp. 21, 33b, A-17, A-18, A-19, A-20
WQ-0010 ✓	Oyster	0.1 Mile Upstream of Turtle River on Purvis Creek	26, pp. 21, 26-29, A-9, A-10, A-11, A-12; 12
WQ-0005 ✓	Crab Tissue	Mouth of the Tributary to Purvis Creek	26, pp.20, 21, 22, 25, 26.; 12
WQ-0001 ✓	Crab Tissue	0.1 Mile Upstream of Turtle River on Purvis Creek	26, pp.20, 21, 22, 25, 26.; 12

Note: See page 5a of this documentation record for sample locations.

Level I Fisheries

** NOTE** Sample results strongly indicate that a Level I Actual Contamination has occurred. However, because the quality assurance information pertaining to this sample data was not readily available at the time of preparation of this documentation, the Level I scoring values are not being used. The above information is being provided for the readers information.

~~Level II Fisheries~~

~~Most Distant Level II Sample~~

Sample ID:

1. WQ-4368 (Water) 12-19-91
2. WQ-2266 (Sediment) 6-26-91
3. WQ-2983 (Sediment) 8-21-91

Distance from the probable point of entry: 0.60 mile directly through wetlands or 1 mile flowing through Purvis Creek and its tributary.

References: 26 pp. 21, A-41, A-53, A-71; 30

Identity of Fishery	Extent of the Level I Fishery (Relative to Probable Point of Entry)
Purvis Creek	The Level I Fishery (established by sampling data) extends from 1.3 miles upstream of the Turtle River, to the mouth of Purvis Creek, at Turtle River (Refs. 3; 26, pp. 21, 33b, A-3, A-4, A-11; 30).
Turtle River	The Level I Fishery (established by sampling data) extends from 0.5 mile upstream of the mouth of Purvis Creek, to 0.5 mile downstream of the mouth of Purvis Creek (Refs. 3; 26, pp. 21, 30, 26, 29, A-15, A-19; 30).

4.1.3.3.1. Food Chain Individual

Portions of Purvis and Turtle Creeks are subject to Level ~~II~~ I concentrations. Recreational and subsistence fishing takes place along both creeks. (Ref.)

WQ-0001

Sample ID:
1. WQ-~~4366~~ 0006
2. WQ-~~4368~~ 0007
3. WQ-~~2265~~ 0008
4. WQ-~~2986~~ 0009
5. WQ-~~2266~~ 0010
6. WQ-~~2083~~ 0005

Hazardous Substance:
1. Mercury
2. Mercury
3. PCBs
4. PCBs and Mercury
5. PCBs
6. PCBs

Bioaccumulation Potential:

1. 50,000
2. 50,000
3. 50,000
4. 50,000 and 50,000
5. 50,000
6. 50,000

Identity of Fishery	Type of Surface Water Body	Reference	Dilution Weight
Purvis Creek	River	1, Table 4-3; 3	0.001
Turtle River	River	1, Table 4-3; 3	0.001

NOTE: The stream flow for Purvis Creek and Turtle River are unknown, therefore, for scoring purposes a conservative estimate of 1,000 to 10,000 cfs will be used. This is equivalent to a dilution weight of 0.001 (Refs. 1, Table 4-13; 30; 31). The 45 points provided for Food Chain Individual are due to Level II concentrations in sediment and surface water samples (Ref. 1, Section 4.1.3.3.1).

= =

Food Chain Individual Factor Value: 45

4.1.3.3.2 Population

4.1.3.3.2.1 Level II Concentrations

Identity of Fishery	Annual Production (pounds)	Reference	Human Food Chain Population Value
Purvis Creek	>0	1, Table 4-13, Table 4-18; 30; 31	0.03
Turtle River	>0	1, Table 4-13, Table 4-18; 30; 31	0.03

Sum of Human Food Chain Population Values: 0.06

(Ref. 1, Sec. 4.1.3.3.2.1)

==========

Level II Concentrations Factor Value: 0.06

4.1.3.3.2.3. Potential Human Food Chain Contamination

Identity of Fishery	Annual Production (pounds)	Type of Surface Water Body	Average Annual Flow (cfs)	Reference	Population Value (P_i)	Dilution Weight (D_i)	$P_i x D_i$
Atlantic Ocean	>0	Shallow Ocean Zone	Flow Not Applicable	1, Table 4-13, Table 4-18; 30; 31	0.03	0.0001	3.0E-6

NOTE: All of the water bodies discussed above are fisheries, however the exact tonnage harvested is unknown. A conservative annual production greater than 0 (Refs. 1, Table 4-18; 30; 31) has been applied.

Sum of P_i x D_i: 3.0E-6
(Sum of P_i x D_i)/10: 3.0E-7

==========

Potential Human Food Chain Contamination Factor Value: 0.0000003

4.1.4.2. WASTE CHARACTERISTICS

4.1.4.2.1. Ecosystem Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Source No.	*Ecosystem Toxicity Factor Value	Persistence Factor Value	Ecosystem Toxicity/Persistence Factor Value (Table 4-20)	Reference
Anthracene	3	10,000	0.4	4000	1;2,p.B-2
Barium	4,5	1	1	1	1;2,p.B-2
Benzo(A) Anthracene	3,4,7	10,000	1	10,000	1;2,p.B-2
Benzo(A)Pyrene	4,7	10,000	1	10,000	1;2,p.B-2
Benzoic Acid	4	1	0.4	0.4	1;2,p.B-3
Chromium	3,4,7	10,000	1	10,000	1;2,p.B-5
Chloroform	1,3,5	10	0.4	4	1;2,p.B-4
Cobalt	4,6	---	1	---	1;2,p.B-5
Copper	3,4,7	1000	1	1000	1;2,p.B-5
Cyanide	4	1000	0.4	400	1;2,p.B-5
Dieldrin	7	10,000	1	10,000	1;2,p.B-7
Ethyl Benzene	3	100	0.4	40	1;2,p.B-9
Hexachloro-benzene	5	10	1	10	1;2, p.B-10
Hexachloroethane	5	1000	0.4	400	1;2, p.B-10
Lead	1,2,3,4,5,7	1000	1	1000	1;2, p.B-11
Manganese	4,5	---	1	---	1;2, p.B-11
Mercury	1,2,3,4,5,6,7	10,000	1	10,000	1;2, p.B-11
Napthalene	3	1000	0.4	400	1;2, p.B-12
Nickel	4,7	1000	1	1000	1;2, p.B-12
PCB	1	10,000	1	10,000	1;2, p.B-13
Phenanthrene	3,4	1000	0.4	400	1;2, p.B-14
Pyrene	3,4	---	1	---	1;2, p.B-15
Tetrechloro-ethene	1,5,7	100	0.4	40	1;2, p.B-16
Toluene	3,7	100	0.4	40	1;2, p.B-16
Trichlorothene	1,5	100	0.4	40	1;2, p.B-17
Xylene (Total)	3	100	0.4	40	1;2, p.B-18
Zinc	1,3,4,5,6,7	100	1	100	1;2, p.B-18

*The Ecotoxicity Value given is the value listed for brackish water as per Refs. 1, Section 4.1.4.2.1.4; 40.

SWOF-Environment/Toxicity/Persistence/Bioaccumulation

Hazardous Substance	Ecosystem Toxicity Persistence Factor Value	Bioaccumulation Factor Value (Section 4.1.3.2.1.2.)	EcosystemToxicity / Persistence/ Bioaccumulation Factor Value (Table 4-21)	Reference
Anthracene	4000	5000	2.0E+07	1; 2, p. B-2
Barium	1	0.5	0.5	1; 2, p. B-2
Benzo(A)Anthracene	10,000	50,000	5.0E+08	1; 2, p. B-2
Benzo(A)Pyrene	10,000	50,000	5.0E+08	1; 2, p. B-2
Benzoic Acid	0.4	5	2	1; 2, p. B-3
Chromium	10,000	500	5.0E+06	1; 2, p. B-5
Chloroform	4	5	20	1; 2, p. B-4
Cobalt	--	0.5	--	1; 2, p. B-5
Copper	1000	50,000	5.0E+07	1; 2, p. B-5
Cyanide	400	0.5	200	1; 2, p. B-5
Dieldrin	10,000	50,000	5.0E+08	1; 2, p. B-7
Ethyl Benzene	40	50	2000	1; 2, p. B-9
Hexachlorobenzene	10	50,000	5.0E+05	1; 2, p. B-10
Hexachloroethane	400	500	2.0E+05	1; 2, p. B-10
Lead	1000	5,000	5.0E+06	1; 2, p. B-11
Manganese	--	0.5	--	1; 2, p. B-11
Mercury	10,000	50,000	5.0E+08	1; 2, p. B-11
Naphthalene	400	500	2.0E+05	1; 2, p. B-12
Nickel	1000	500	5.0E+05	1; 2, p. B-12
PCB	10,000	50,000	5.0E+08	1; 2, p. B-13
Phenanthrene	400	50	2.0E+04	1; 2, p. B-14
Pyrene	--	50	--	1; 2, p. B-15
Tetrachloroethene	40	50	2000	1; 2, p. B-16
Toluene	40	50	2000	1; 2, p. B-16

Trichloroethene	40	50	2000	1; 2, p. B-17
Xylene (Total)	40	500	2.0E+04	1; 2, p. B-18
Zinc	100	50,000	5.0E+06	1; 2, p. B-18

==========

Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value: 5.0E+08

4.1.4.2.2. Hazardous Waste Quantity

Source №	Source Hazardous Waste Quantity Value (Section 2.4.2.1.5.)	Is source hazardous constituent quantity data complete? (yes/no)
1	646.15	NO
2	738.46	NO
3	3.50	NO
4	*0.00	NO
5	9961.54	NO
6	3076.92	NO
7	*0.00	NO

Sum of values: 14,426.57

*For the purposes of this documentation record, it was assumed that the areas of Source №s 4 and 7 are greater than 0, therefore 0 was added in as the Source Hazardous Waste Quantities (HWQ's).

4.1.4.2.3. Waste Characteristics Factor Category Value

Ecosystem Toxicity/Persistence Factor Value: 10,000
Hazardous Waste Quantity Factor Value (Ref. 1, Table 2-6): 10,000
Bioaccumulation Potential Factor Value: 50,000

Ecosystem Toxicity/Persistence Factor Value
x Hazardous Waste Quantity Factor Value: 1.0E+08
(10,000 x 10,000 = 1.0E+08)

(Ecosystem Toxicity/Persistence x Hazardous Waste Quantity)
x Bioaccumulation Potential Factor Value: 5.0E+12
(1.0E+08 x 50,000 = 5.0E+12)

As applied to Reference 1, Table 2-7, yields a Waste Characteristics Factor Category Value of 1,000.

==========

Hazardous Waste Quantity Factor Value: 10,000
Waste Characteristics Factor Category Value: 1,000

4.1.4.3. ENVIRONMENTAL THREAT - TARGETS

Level I Concentrations

Sample ID:
1. WQ-4366 (12-19-91) (Ref. 26, p. A-74)
2. WQ-4368 (12-19-91) (Ref. 26, p. A-71)

Sample Medium:
1. Water
2. Water

Location:
1. Mouth of Tributary to Purvis Creek.
2. 0.1 Mile Upstream of Turtle River on Purvis Creek.

Reference: 26, p. 21

Hazardous Substance	Hazardous Substance Concentration	Benchmark Concentration	Benchmark
1. Mercury	0.6 µg/l	0.012 µg/l	AWQC/AALAC
2. Mercury	0.4 µg/l	0.012 µg/l	AWQC/AALAC

Reference for Benchmarks: 2

Most Distant Level I Sample

Sample ID:
WQ-4368 (12-19-91)
Media: Water

Distance from the probable point of entry: 0.60 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek.

Reference: 3; 26, p. A-71; 30

Most Distant Level II Sample

Sample ID:
1. WQ-2266 6-26-91 (Sediment)
2. WQ-2983 8-21-91 (Sediment)

Distance from the probable point of entry: 0.6 mile directly through wetlands or 1 mile flowing through the canal and Purvis Creek. Both WQ-2266 and WQ-2983 were collected from the same location.

Reference: 3; 26, pp. A-41, A-53; 30

4.1.4.3.1. Sensitive Environments

4.1.4.3.1.1 Level I Concentrations

Sensitive Environments

Wetlands

Wetland	Wetland Frontage	Reference
Canal and Purvis Creek	1 mile with wetlands on both sides of water bodies - the canal and Purvis Creek; therefore 2 miles of wetlands frontage	3; 26, p. 21; 30

Total Wetland Frontage: 2 miles References: 3, 26, p. 21

Wetland Value: 50

Sum of Sensitive Environments Value + Wetland Value: 50

For a Level I Concentration, the sum of the sensitive environments value and wetland value is multiplied by 10 to obtain the Level I Concentrations Factor Value (Ref. 1, Section 4.1.4.3.1.1.). (50 x 10 = 500).

==========

Level I Concentrations Factor Value: 500

4.1.4.3.1.2. Level II Concentrations

Level I concentrations from the DNR, EPD investigation extend to the same location as Level II, therefore only Level I concentrations are used (Refs. 1, Section 4.1.4.3.1.2; 26, pp. 21, A-71, A-74).

Some Level II samples from the NUS investigation exist on the eastern edge of the wetlands, however in effect these wetlands have been counted for scoring purposes using Level I concentrations, therefore they will not be used (Refs. 3; 4, pp. 8, 14, 15; 26, pp. 21, A-41, A-53).

4.1.4.3.1.3. Potential Contamination

Sensitive Environments

Type of Surface Water Body	Designated Sensitive Environment	State (S) or Federal (F) Threatened (T) or Endangered (E)	Ref.	Sensitive Environment Values(s)
Turtle/ Brunswick River *(Large River)	West Indian Manatee	F E	32; 19, p.5	75
	Wood Stork	F E	32; 19,p.5; 14,p.12	75
	Loggerhead Sea Turtle	F T	32; 19,p.5; 14,p.12	75
	Atlantic Green Turtle	F T	19,p.5; 14,p.12	75
	Atlantic Hawksbill Sea Turtle	F E	19,p.5; 14,p.12	75
	Atlantic Ridley Sea Turtle	F E	19,p.5; 14,p.12	75
	Leatherback Sea Turtle	F E	19,p.5; 14,p.12	75
	Bald Eagle	F T	19,p.5; 14,p.12	75
	Piping Plover	F T	19,p.5	75
	Peregrine Falcon	S E	19,p.5	50
	Gull-Tilled Tern	S T	19,p.5	50
	Gopher Tortoise	S T	19,p.5	50
	Pondspice	S T	19,p.5	50
Atlantic Ocean (Shallow Ocean Zone)	West Indian Manatee	F E	32; 13; 14	75
	Wood Stork	F E	32; 13; 14	75
	Loggerhead Sea Turtle	F T	32; 13; 14	75
	Atlantic Green Sea Turtle	F T	13; 14	75

	Atlantic Hawksbill Sea Turtle	F	E	13; 14	75
	Atlantic Ridley Sea Turtle	F	E	13; 14	75
	Leatherback Sea Turtle	F	E	13; 14	75

Wetlands

Type of Surface Water Body	Wetlands Frontage	Ref.	Wetlands Value for Type of Surface Water Body
Turtle/Brunswick River *(Large River)	**16.94 miles	30; 31; 25A	450

* No known flow information exists for the Turtle/Brunswick Rivers, therefore for scoring purposes a conservative estimate of 10,000 to 100,000 cfs will be used; the corresponding dilution weight is .0001 (Refs. 1, Table 4-13).

** The measurement of 16.94 miles was calculated from the end of the zone of actual contamination in Purvis Creek, Purvis Creek, Turtle River, and Brunswick River, terminating at the Atlantic Ocean (Refs. 1, Section 4.1.4.3.1.3; 25a).

NOTE: The same species inhabit both the Turtle/Brunswick Rivers and the Atlantic Ocean and have the same dilution weight, therefore the three values of 75 have been counted for scoring purposes one time.

Type of Surface Water Body	Sum of Sensitive Environment Values (Sj)	Wetland Frontage Value (Wj)	Dilution Weight (Dj)	Dj(Wj + Sj)
Large River	875	450	.0001	.0001 (1325)
Shallow Ocean Zone				

Both water bodies have a dilution weight of .0001 (Ref. 1, table 4-13).

Sum of $D_j(W_j + S_j)$: 0.1325
(Sum of $D_j(W_j + S_j)$)/10: 0.01325

==========

Potential Contamination Factor Value: 0.01325